LOUISIANA DEPARTMENT OF EDUCATION

Office of Assessments, Analytics, and Accountability

LEAP Assessment Guide for Grade 4 Science

Purpose

This document is designed to assist Louisiana educators in understanding the LEAP Grade 4 Science assessment.

Introduction

All students in grades 3-8 and Biology will take the LEAP science assessments, which provide

- questions that have been reviewed by Louisiana educators to ensure their alignment to the Louisiana Student Standards for Science and appropriateness for all Louisiana students;
- measurement of the full range of student performance; and
- information for educators and parents about student readiness in science and whether students are “on track” for college and careers.

Vision for Science Standards and Assessment

The Louisiana Student Standards for Science (LSS for Science) provide appropriate content for all grades or courses, maintain high expectations, create a logical connection of content across and within grades, represent the knowledge and skills students need to successfully transition to postsecondary education and the workplace, and call for students to apply content knowledge; investigate, evaluate, and reason scientifically; and connect ideas across disciplines.

Assessment Design

Supporting Science Instruction

The LEAP tests will assess students' understanding of the LSS for Science, reflecting the multiple dimensions of the standards.

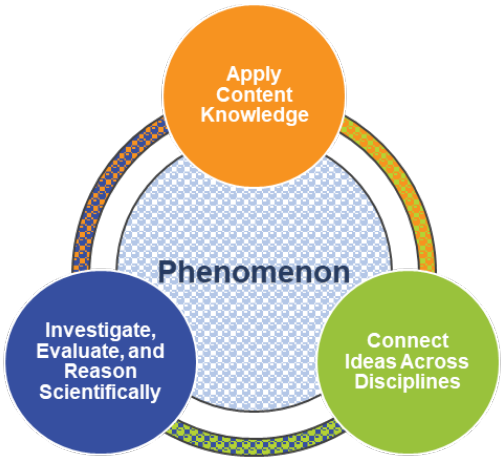
Apply content knowledge and skills (Disciplinary Core Idea, DCI)

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 skills and knowledge students are expected to master by the end of the course.

On the LEAP test, students answer questions which require content knowledge and skills aligned to PE bundles (groupings of PEs) and the corresponding DCIs.

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

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



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

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).

On the LEAP 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 test includes item sets and standalone items. A scientific **phenomenon** provides the anchor for each item set or standalone item. Stimulus materials, related to the scientific phenomenon, provide context and focus for sets. 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. 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. Some **item sets** culminate with a short constructed-response item. Each test includes **standalone items** which are not part of an item set.

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 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.
- Two-part SR: requires students to answer two related questions, worth two points. Two-part items may combine SR item types.
    - Two-part Dependent (TPD): the first SR must be correct in order to earn credit for the second SR item.
    - Two-part Independent (TPI): each SR 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.

Test Design

The LEAP Science Grade 4 test will contain seven item sets and eight standalone items. The test will also include a field-test item set and standalone items, which will not count toward a student's final score on the test. The table below outlines the test design.

Test Session	Component	Points	Time Allowed
Session 1	3 Item Sets	18	80 minutes
	8 Standalone Items	10	
Session 2	4 Item Sets	24	80 minutes
Total Operational	7 Item Sets and 8 Standalones	52	160 minutes

The design of the LEAP Grade 4 Science Practice Test differs from the design of the operational test since it includes a task with an extended-response item. Because students in grade 4 should learn how to express scientific understanding and reasoning with written explanation, it is essential that teachers continue to incorporate extended-response tasks into classroom instruction and formative classroom assessments. The continued use of extended-response tasks in the classroom will deepen students' understanding of the content and help students transfer that understanding to different phenomena and ensure student readiness for the next grade.

Reporting Categories

All Louisiana Student Standards for Science are eligible for assessment. The LEAP science assessments examine students' performance of scientific and engineering practices (SEPs) in the context of disciplinary core ideas (DCIs) and crosscutting concepts (CCCs). Although these SEPs are described separately, they generally function in concert. This overlap of SEPs means that assessment items must be designed around a bundle of related performance expectations (PEs) and not tested in isolation from one another.

The table below shows the reporting category titles and descriptions as well as the PEs associated with each reporting category.

Reporting Category	Description	Content
Investigate	Ask Questions, Define Problems, and Plan Investigations	4-PS3-2, 4-PS3-3, 4-ESS2-1, 4-ESS2-3,
Evaluate	Analyze and Interpret Data, Use Mathematics and Computational Thinking, and Engage in Argument from Evidence	4-LS1-1, 4-ESS2-2
Reason Scientifically	Develop and Use Models, Construct Explanations, and Design Solutions	4-PS3-1, 4-PS3-4, 4-PS4-1, 4-PS4-2, 4-LS1-2, 4-ESS1-1, 4-ESS3-2

4-ESS3-1 may be assessed and would be reported as part of the overall score. This particular PE does not fit neatly into any one of the three categories; rather, it partly touches all three categories

Achievement-Level Definitions

Achievement-level definitions briefly describe the expectations for student performance at each of Louisiana's five achievement levels:

- **Advanced:** Students performing at this level have **exceeded** college and career readiness expectations and are well prepared for the next level of study in this content area.
- **Mastery:** Students performing at this level have **met** college and career readiness expectations and are prepared for the next level of study in this content area.
- **Basic:** Students performing at this level have **nearly met** college and career readiness expectations and may need additional support to be fully prepared for the next level of study in this content area.
- **Approaching Basic:** Students performing at this level have **partially met** college and career readiness expectations and will need much support to be prepared for the next level of study in this content area.
- **Unsatisfactory:** Students performing at this level have **not yet met** the college and career readiness expectations and will need extensive support to be prepared for the next level of study in this content area.

Achievement Level Descriptors

Achievement Level Descriptors (ALDs) indicate what a typical student at each level should be able to demonstrate based on his or her command of grade-level standards. ALDs are written for the three assessment reporting categories. Access the ALDs on the Assessment Resources Webpage for a breakdown of the knowledge, skills, and practices associated with each achievement level.

Test Administration

The testing window opens April 1, 2026, and runs through May 15, 2026, for all computer-based tests. The school or district test coordinator will communicate each school's testing schedule. For updates to the testing schedule, refer to 2025-2026 Louisiana Assessment Calendar All LEAP assessments are timed. No additional time is permitted, except for students who have a documented extended time accommodation (e.g., an IEP).

Scheduling Requirements for Computer-Based Testing

Computer-based testing allows school systems some flexibility in scheduling. However, to reduce incidences of testing irregularities, school systems **must** adhere to the following scheduling and administration practices:

- Testing students in the same grade level across the school at or very close to the same time
- Completing makeup testing for students immediately upon their return
- Limiting student interaction during breaks between test sessions
- Isolating students who have not completed testing for the day (e.g., students with extended time accommodation)
- Preventing interaction between groups of students taking the same tests at different times within a testing day
- Requiring the completion of a session once it is opened (i.e., limiting the reopening of test sessions)
- Taking the sessions within a content area in the correct order (e.g., Math Session 1 taken before Math Session 2)

The following is also recommended:

- Limiting sessions to no more than three in one day for a student; and
- Administering no more than one session that includes an extended-response task or writing prompt (e.g., grades 4-8 Social Studies Session 2, ELA Session 1, ELA Session 2, English I and 2 Sessions 1 and 2, and U.S. History Session 2) in a day to an individual student.

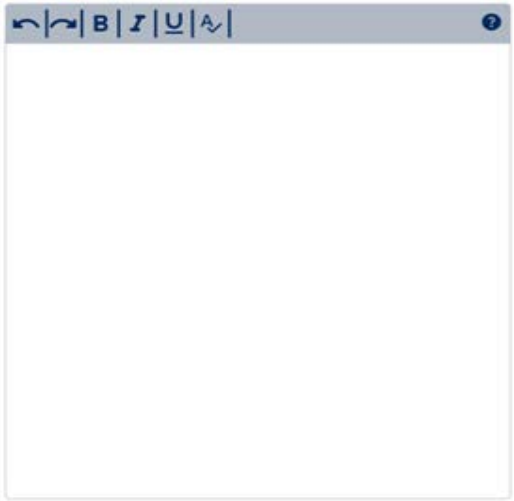
For more information about scheduling and administration policies, refer to the Online Assessment Scheduling Guidance, found on the LDOE Assessment Resources Webpage.

Testing Materials

All students should receive scratch paper and two pencils from their test administrator.

Testing Platform

Students will enter their answers into the online testing system. When composing their written responses, 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 an 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 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, highlight text, take notes, enlarge the item, apply a mask to cover a part of the screen, and guide the reading of a text or an item line by line. A help tool is also featured to assist students as they use the online system.

- Pointer
- Highlighter
- Sticky note
- Masking
- Cross-off
- Magnifier
- Line guide
- Help

All students taking the computer-based test should work through the Online Tools Training, using the online tools so students are well prepared to navigate the online testing system.

Sample Test Items

Standalone Items

Before the standalone items, the item set, and the task, included in this section, is a table containing item type, alignment information, and point values. Additionally, analyses of the multi-dimensional alignment for each standalone item, each item in the item set, and each item in the task, as well as rubrics for the CRs and ERs are included.

Item Type	PE	DCI	SEP	CCC	Points
MC	4-PS3-2	UE.PS3A.b; UE.PS3B.a; UE.PS3B.c		E/M	1
MC	4-PS3-3	UE.PS3B.a		E/M	1
TPI	4-LS1-2	UE.LS1D.a	6. E/S		2
MC	4-ESS2-1	UE.ESS2A.a	3. INV	C/E	1

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

Multiple-Choice Item

Performance Expectation: **4-PS3-2** Make observations to provide evidence that energy can be transferred in many ways and between objects to explain the presence of different types of energy when the blender is running.

A student uses a blender to make a milk shake. He plugs the blender into a wall outlet. He adds ice cream and milk and turns the blender on. While the student is running the blender, the phone rings. He does not hear the ring over the noise of the blender. After he turns the blender off, he pours his drink into a glass. He observes that the base of the blender is warm.

Which statement describes a way that energy is transferred in the blender?

A. The blender's kinetic energy changes directly into light energy.

B. The blender's electrical energy changes directly into sound energy.

C. The blender's heat energy changes into both mechanical and sound energy.

D. The blender's mechanical energy changes into both heat and sound energy.*

Multi-Dimensional Alignment: The item requires the student to apply knowledge that **energy can be moved from place to place by moving objects or through sound and light energy** to demonstrate an understanding that energy **can be transferred in various ways**.

Multiple-Choice Item

Performance Expectation: **4-PS3-3** Ask questions and predict outcomes about the changes in energy that occur when objects collide.

Students are practicing softball on a windy day. The pitcher throws the softball toward the batter. The students notice that the softball moves faster after it is hit by the bat than when it is thrown by the pitcher. Which statement **best** explains what happens to the energy of the softball when it is hit by the bat?

A. When the bat hits the ball, energy transfers from the softball to the bat.

B. The softball is still moving, so there is no transfer of energy to or from the softball.

C. There is a transfer of energy from the softball to the bat, increasing the energy of the bat's movement.

D. There is a transfer of energy from the bat to the softball, increasing the energy of the softball's movement.*

Multi-Dimensional Alignment: The item requires the student to apply knowledge that **when objects collide, energy can be transferred from one object to another, changing their motion** to demonstrate an understanding that **energy can be transferred in various ways**.

Two-Part Independent Item (Part A: Multiple Choice, Part B: Multiple Choice)

Performance Expectation: **4-LS1-2** Construct an explanation to describe how animals receive different types of information through their senses, process the information in their brains, and respond to the information in different ways.

Nine-banded armadillos are usually active at night. They have very small eyes and cannot see objects that are far away. They use their noses to find food that is as deep as 20 centimeters underground. Armadillos also use their noses to loosen soil and use their claws to dig in the soil. They use their good hearing to listen for predators.

Part A
Which claim is supported by the information about armadillos?

A. Armadillos use their sense of smell to find food.*
B. Armadillos use their sense of touch to hide from predators.
C. Armadillos use their sense of hearing to find food that is far away.
D. Armadillos use their sense of sight to see predators that are nearby.

Part B
An armadillo is looking for food at night and finds a new object in its environment. Which statement describes how the armadillo will **most likely** use its senses to take in information about the new object to determine if the new object is food?

A. The armadillo will use its ears and compare the sound the object makes to known sounds.
B. The armadillo will use its nose and compare the smell of the object with known smells.*
C. The armadillo will use its eyes and compare the look of the object with the look of known objects.
D. The armadillo will use its claws and compare the feel of the object with the feel of known objects.

Multi-Dimensional Alignment: While effectively applying the science practice of **constructing explanations** by **explaining observed relationships**, the student demonstrates knowledge that **different sense receptors are specialized to allow an animal's brain to process particular kinds of information**.

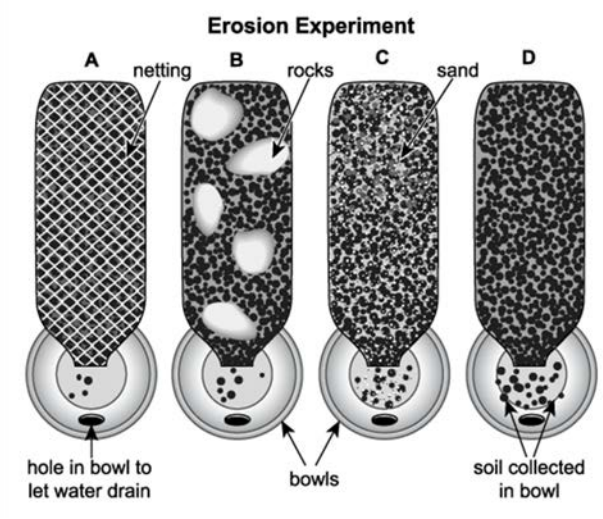
Multiple-Choice Item

Performance Expectation: **4-ESS2-1** Plan and conduct investigations on the effects of water, ice, wind, and vegetation on the relative rate of weathering and erosion.

Students experiment to find out whether different materials could be used to slow down the erosion of the Louisiana coastline.

- They cut four 3-liter plastic bottles in half from top to bottom.
- They add the same amount of soil to each bottle.
- They add different kinds of materials to the soil in three of the bottles.
- They put a bowl at the end of each bottle.
- They pour 100 milliliters of water over the soil in each bottle.

The setup of their experiment is shown in the figure.



The students dry and weigh the soil from the bowls. Their data are shown in the table.

Erosion Experiment Data

Bottle	Material Added to Soil	Soil Weight (grams)
A	netting	0.4
B	rocks	0.5
C	sand	1.8
D	no material added	2.5

Based on the students' data, which statement describes the material that will help prevent the **greatest** amount of erosion?

A. Add netting, because it kept the greatest amount of soil in the bottle.*

B. Add sand, because some of it moved into the bowl along with the soil.

C. Add rocks, because only a few were needed in order to keep a lot of soil in the bottle.

D. Add no material, because having only soil caused the greatest amount of soil to move into the bowl.

Multi-Dimensional Alignment: The item requires the student to apply the science practice of **planning and carrying out an investigation** and knowledge that **water helps shape the land and can break down and move soil around** to demonstrate an understanding of **cause and effect relationships.**

Item Set: How Bears See

Performance Expectations:

4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

4-LS1-2 Construct an explanation to describe how animals receive different types of information through their senses, process the information in their brains, and respond to the information in different ways.

Item Type	PE	DCI	SEP	CCC	Points
MC	4-PS4-2	UE.PS4B.a	2. MOD		1
MC	4-LS1-2		6. E/S	C/E	1
TPD	4-LS1-2	UE.LS1D.a	6. E/S	C/E	2
CR	4-PS4-2	UE.PS4B.a	2. MOD	C/E	2

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

Stimulus Materials

Use the information about how bears see and your knowledge of science to answer the questions.

How Bears See

Animals use their vision and other senses to help them find food. Comparing differences in animals' activities can help in understanding differences in their eyesight.

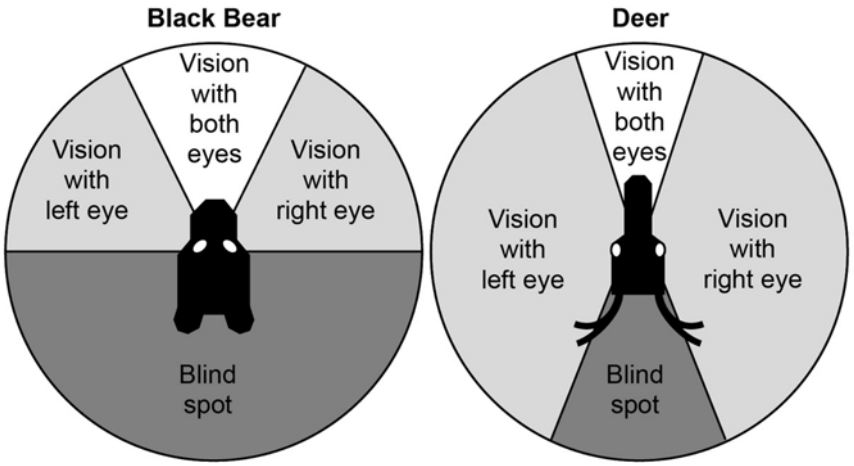
Table 1 shows some information about black bears and deer.

Table 1. Black Bear and Deer Facts

	Black Bear	Deer
Diet	plants, fruits, nuts, insects, fish, mammals	grasses, leaves, twigs, fruit, nuts
Behavior	mostly active at night; some activity during the day	active at dawn and at dusk
Predators	no natural predators	wolves, coyotes, mountain lions, bobcats

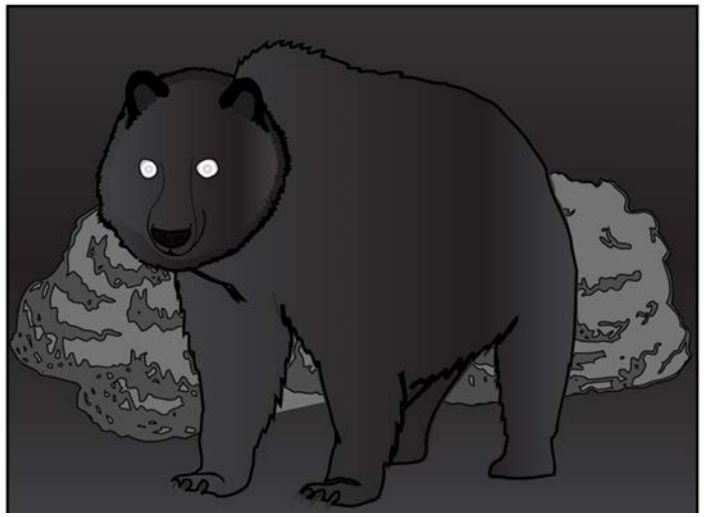
A blind spot is a place where an animal cannot see. Figure 1 shows the blind spots of a black bear and a deer.

Figure 1. Black Bear and Deer Vision



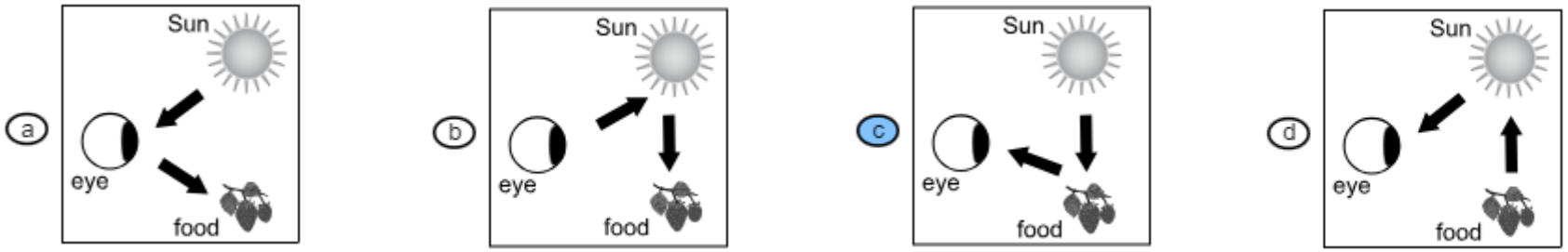
Black bears can see well at night. This is because there is a thin layer of shiny material on the insides of their eyes. This helps their eyes capture more light and makes their eyes appear to glow at night, as shown in Figure 2.

Figure 2. Black Bear at Night



Multiple-Choice Item

Which model shows the path of light that allows a bear to see its food during the day?



Multi-Dimensional Alignment: While effectively applying the science practice of using models by **using a model to describe the path of light that allows a bear to see**, the student demonstrates knowledge that **an object can be seen when light reflected from its surface enters the eyes**.

Multiple-Choice Item

Which sentence **best** explains what causes a bear's eyes to appear to glow at night, as shown in Figure 2?

A. Light is transmitted from objects to the bear's eyes.

B. Light is produced by the bear's eyes at night.

C. Extra light is stored in the bear's eyes during the daytime.

D. Extra light captured by the bear's eyes is reflected back out of the eyes.*

Multi-Dimensional Alignment: While effectively applying the science practice of **constructing explanations** by **explaining observed relationships between light and the bear's eye**, the student demonstrates an understanding of **cause and effect relationships**.

Two-Part Dependent Item (Part A: Multiple Select, Part B: Multiple Choice)

Part A
Which statements explain why bears and deer need different information to help them survive?

Select the **two** correct answers.

A. Deer need to find food at night.

B. Bears need to find food that they cannot see.

C. Deer need to know if there are predators nearby.*

D. Deer need to travel long distances to find enough food.

E. Bears need to see prey such as fish so that they can catch them.*

Part B
Which statement supports the answer to Part A?

A. Bears have paws that can identify textures, but deer do not.

B. Deer have tongues that detect sweetness, but bears do not.

C. Deer have eyes that see almost all around them, but bears have eyes that see mostly in front of them.*

D. Bears have small ears that can turn in different directions, but deer must turn their heads to hear sounds.

Multi-Dimensional Alignment: The item requires the student to apply the science practice of **constructing explanations** and knowledge that **different sense receptors are specialized to allow animals to process particular kinds of information** to demonstrate an understanding of **cause and effect relationships**.

Constructed-Response Item

A bear is hunting during a night when the Moon is full. A large cloud moves in front of the Moon and blocks the Moon's light. Explain whether the bear can see better before the cloud covers the Moon or after the light is blocked. Support your answer with evidence about how a bear is able to see and how a change in the amount of light affects the bear's vision.

Multi-Dimensional Alignment: The item requires the student to apply the science practice of **using models** and knowledge that **an object can be seen when light reflected from its surface enters the eyes** to demonstrate an understanding of **cause and effect relationships**.

Scoring Guide

Scoring Information	
Score	**Description**
2	Student's response correctly explains whether the bear can see better before the cloud covers the Moon or after the light is blocked AND uses evidence to support the explanation.
1	Student's response correctly explains whether the bear can see better before the cloud covers the Moon or after the light is blocked, but does not use evidence to support the explanation.
0	Student's response does **not** correctly explain whether the bear can see better before the cloud covers the Moon or after the light is blocked or use evidence to support the explanation.

Scoring Notes:

- Explanation of whether the bear can see better before the cloud covers the Moon or after the light is blocked (1 point)
- Providing evidence to support the explanation (1 point)

Examples include:

- A bear can see better before the cloud covers the Moon than when the light is blocked. When there is light, the bear can see. When the light is blocked, the bear cannot see. When the Moon is not blocked by the cloud, the Moon's light can reflect off food and go into the bear's eyes. When the Moon's light is blocked, the light cannot reflect off the food and go into the bear's eyes.
- The bear cannot see after the light is blocked because light has to reflect off food and go into a bear's eye. If there is no light from the moon, then light cannot go into the bear's eye.

Accept other reasonable answers.

Because students in grade 4 should learn how to express scientific understanding and reasoning with written explanation, it is essential that teachers continue to incorporate extended-response tasks into classroom instruction and formative classroom assessments. The continued use of extended-response tasks in the classroom will deepen students' understanding of the content and help students transfer that understanding to different phenomena and ensure student readiness for the next grade.

Task Set: The Ages of Louisiana Soil and Fossils

Performance Expectations:
4-ESS1-1 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in landforms over time.
4-ESS2-1 Plan and conduct investigations on the effects of water, ice, wind, and vegetation on the relative rate of weathering and erosion.

Item Type	PE	DCI	SEP	CCC	Points
MC	4-ESS1-1	UE.ESS1C.a	6. E/S		1
TPD	4-ESS1-1	UE.ESS1C.a	6. E/S	PAT	2
MC	4-ESS1-1	UE.ESS1C.a	6. E/S		1
TPD	4-ESS2-1	UE.ESS2A.a	3. INV	PAT	2
ER	4-ESS2-1; 4-ESS1-1	UE.ESS2A.a; UE.ESS1C.a	6.E/S	C/E	6

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

Stimulus Materials:

Use the information about the ages of Louisiana soil and fossils and your knowledge of science to answer the questions.

The Ages of Louisiana Soil and Fossils

Most of the fossils in Louisiana are found in gravel at the bottom of rivers. These fossils are from plants and animals that lived more than 250 million years ago (mya). Other fossils in Louisiana are found in rock cliffs. These fossils are usually younger than the ones in river gravel.

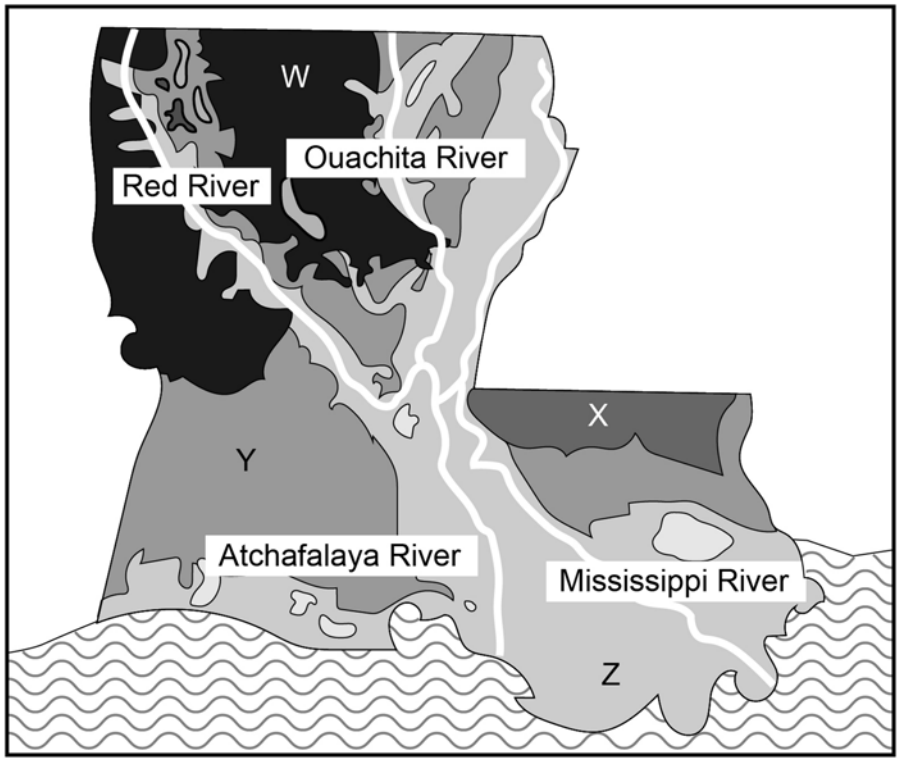
Some of the fossils found in Louisiana are shown in Table 1.

Table 1. Fossils Found in Louisiana

Fossil Type	When the Animal Lived (millions of years ago)	Where the Animal Lived
trilobite 	540 mya to 300 mya	ocean
coral 	440 mya to 300 mya	ocean
whale 	56 mya to 34 mya	ocean
camel 	23 mya to 5.3 mya	land

Soil in some areas of Louisiana is older than soil in other areas of the state. Map 1 shows the ages of the top layers of soil in each part of Louisiana.

Map 1. Ages of Top Layers of Soil in Louisiana



Key	
W 66 mya to 5.3 mya	Z 12,000 years ago to present
X 5.3 mya to 2.6 mya	open water
Y 2.6 mya to 12,000 years ago	

Table 2 shows time periods of different eras in Earth's history.

Table 2. Geologic Time Scale

Era	Period of Time (millions of years ago)
Cenozoic	66 mya to present
Mesozoic	250 mya to 66 mya
Paleozoic	540 mya to 250 mya
Precambrian	4,600 mya to 540 mya

Multiple-Choice Item

Use the information in Map 1 and Table 2 to answer the question.

Camel fossils are not found in the top layers of soil near Louisiana's rivers, but they are found in areas away from rivers. Which statement **best** explains why camel fossils are **not** found near rivers in Louisiana?

A. The soil around the rivers does not have any fossils in it.

B. The soil around the rivers was brought there from other places.

C. The soil around the rivers is not old enough to have camel fossils.*

D. The soil around the rivers has been washed away, and the fossils are missing.

Multi-Dimensional Alignment: While effectively applying the science practice of **constructing explanations** by **identifying evidence that supports an explanation**, the student demonstrates knowledge that **patterns of rock layers change over time due to Earth's forces**.

Two-Part Dependent Item (Part A: Multiple Choice, Part B: Multiple Select)

Use the information in Map 1 and Table 2 to answer the questions.

Part A

A fossil is found in the top layer of soil in Region Y. To which era does this fossil **most likely** belong?

A. Cenozoic*

B. Mesozoic

C. Paleozoic

D. Precambrian

Part B

Which statements are evidence to support the answer to Part A?

Select the **two** correct answers.

A. The soil in Region Y covers older rock layers.

B. The top layer of soil in Region Y is from no more than 2.6 mya.*

C. Some of the fossils found in Louisiana are from the Paleozoic era.

D. The oldest top layer of soil in Louisiana is from between 66 mya and 5.3 mya.*

E. Fossils found in gravel from rivers are older than other fossils in Louisiana.

Multi-Dimensional Alignment: The item requires the student to apply the science practice of **identifying evidence that supports an explanation** and knowledge that **the presence and location of certain fossil types indicate the order in which rock layers were formed** to demonstrate an understanding of **patterns**.

Multiple-Choice Item

A student claims that the top layer of soil in Louisiana is young compared with the land in other states. Which statement **best** supports this claim?

A. Earthquakes cause land to shift and make new soil.

B. Most of the soil found in Louisiana is from the Mesozoic era.

C. Rivers deposit younger soil on top of older soil as they move.*

D. Fossils from the Paleozoic era are found in gravel near rivers.

Multi-Dimensional Alignment: While effectively applying the science practice of **constructing explanations** by **identifying evidence that supports an explanation**, the student demonstrates knowledge that **patterns of rock layers change over time due to Earth's forces**.

Two-Part Dependent Item (Part A: Multiple Choice, Part B: Multiple Choice)

A student sees a whale bone fossil in the rock layers on the side of a river in Louisiana. The fossil was not visible in the rock layers one year ago.

Part A

The student wants to investigate what caused the whale bone fossil to become visible. She places a piece of bone in a pile of soil and packs the soil down. Which action is **most** appropriate for the student to take in order to investigate what caused the whale bone fossil to become visible?

A. Shake the pile of soil until the bone becomes visible.

B. Freeze and thaw the soil until the bone becomes visible.

C. Place a heat lamp over the pile of soil until the bone becomes visible.

D. Sprinkle water over the top of the soil until the bone becomes visible.*

Part B

Which statement best explains the answer to Part A?

A. Rain eroded the rock layer beside the river and made the fossil visible.*

B. Heat energy caused the lighter layers of rock to break off and fall away.

C. Earthquakes shook the rock around the fossil loose and made the fossil visible.

D. Changes in seasonal temperatures caused the rock around the bone to fall away.

Multi-Dimensional Alignment: The item requires the student to apply the science practice of **identifying evidence that supports an explanation** and knowledge that **rock layers change over time due to Earth's forces** to demonstrate an understanding of **patterns**.

Extended-Response Item

Use Map 1 and Table 2 to answer the question.

A scientist finds a trilobite fossil on the ground in Region Z. He claims that the trilobite fossil did not form in Louisiana. Using evidence from the information about the ages of Louisiana soil and fossils, write an explanation that supports the scientist's claim. In your response, be sure to explain:

- why the fossil did not form in the area that is now Louisiana
- where the fossil most likely came from
- what happened to cause the fossil to move from its starting place to Region Z

As you write, be sure to:

- Address all parts of the prompt.
- 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 **identifying evidence that supports an explanation** and knowledge that:

- **rock layers change over time due to Earth's forces,** and
- **water and weathering help shape the land by breaking down rocks, soil, and sediments and moving them around**

to demonstrate an understanding of **cause and effect relationships**.

Score Points

The student's score is the sum total of all points earned (up to a maximum of 6 points) in the item.

- No response (blank) or a response that does not address the prompt earns 0 points.
- 2 points for explaining why the fossil did not form in the area that is now Louisiana.
  - Score 2 points: Correct explanation that is supported with evidence.

  OR
  - Score 1 point: Correct explanation, but no evidence is given.
- 1 point for explaining where the fossil most likely came from.
- 3 points for explaining what happened to cause the fossil to move from its starting place to Region Z.
  - Score 3 points: Correctly identifies erosion, describes the process, and explains how the fossil was transported.

  OR
  - Score 2 points: Correctly identifies erosion and explains how the fossil was transported.

  OR
  - Score 1 point: Correctly explains how the fossil was transported.

Score Information

1. Why the fossil formed in another place:
   - The soil in Region Z was formed at a different time than the fossil, so the fossil could not have formed in Region Z.
   - Trilobites are from 540 mya to 300 mya (Paleozoic era). The soil in Region Z is from 12,000 years ago to present (Cenozoic era).
2. Where the fossil came from:
   - The fossil probably came from a place that has very old rock that is the same age as the fossil.
3. Why the fossil moved to Region Z:
   - The fossil moved from its starting place because of erosion.
   - Wind or rain wore away the rock that covered the fossil until the fossil became separated from the rock.
   - The fossil moved downward into a river, and the river brought the fossil to Region Z.

Also accept other correct descriptions of weathering and erosion, such as freezing water in spaces between the fossil and the rock and pushing the fossil and rock apart.

Resources

Assessment Guidance Webpage

- Assessment Development Educator Review Committees: describes the item development process and the associated committees, includes information on applying for participation

Practice Test Webpage

- LEAP Grade 4 CBT Practice Test Answer Key: helps prepare students for the spring assessment, includes answer keys, scoring rubrics, and alignment information
- LEAP Science Practice Test Guidance: provides guidance on using the practice tests to support instructional goals
- Practice Test Quick Start Guide: provides information regarding administration and scoring of online practice tests

Assessment Resources Webpage

- 2025-2026 Louisiana Assessment Calendar: includes information on testing windows for test administrations
- Grade 4 Science Achievement Level Descriptors: contains descriptions of the knowledge, skills, and processes that students demonstrate with relative consistency and accuracy at each level of achievement
- LEAP Accessibility and Accommodations Manual: provides information about accessibility and accommodations
- LEAP Technology Enhanced Item Types: provides a summary of technology enhanced items students may encounter in any CBT across courses and grade levels

DRC INSIGHT Portal:

- includes access to tutorials, manuals, and user guides
- LEAP Science Grade 4 Practice Test: helps prepare students for the spring assessment
- Online Tools Training: allows students to become familiar with the online testing platform and its available tools; also available through this link using the Chrome browser

K-12 Science Planning Webpage

- K-12 Louisiana Student Standards for Science (2017): provides the performance expectations for all grades
- Planning Guide for Science Instruction: assists educators in planning with high quality curriculum
- Grade 4 Louisiana Guide to Implementing Amplify: assists teachers with the implementation of high quality curriculum
- Grade 4 Louisiana Guide to Implementing PhD Science: assists teachers with the implementation of high quality curriculum
- Grade 4 Formative Assessment Items: instructional resources that teachers can download and incorporate into their daily instruction; contact school test coordinator for instructions on accessing the file (Password to access document is Educate2020)
- Grade 4 Louisiana Guide to Piloting OpenSciEd: assists teachers with the implementation of high quality curriculum

Contact the LDOE

- assessment@la.gov for assessment questions
- STEM@la.gov for instructional or curriculum implementation support
- ldoecommunications@la.gov to subscribe to newsletters; include the newsletter(s) you want to subscribe to in your email

Newsroom: archived copies of newsletters including LDOE Weekly School System Newsletters and Teacher Leader Newsletters

Updates Log

The table below lists any updates made to this document after the original post date.

Available	Description of Updates
July 2025	2025-2026 Assessment Guides original posting

Email assessment@la.gov with any questions or comments about this assessment guide.