

This guide includes the following sections:

- Purpose
- Assessment Design
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- Sample Test Items
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UPDATE INCLUDED 4/22/19

❖ [Provided More Reporting Information](#)

## PURPOSE

This document is designed to assist Louisiana educators in understanding the new LEAP 2025 Science assessment for grade 4, which will be administered for the first time spring 2019.

### Introduction

All students in grades 3-8 and 10 will take the LEAP 2025 Science assessments, which provide

- questions that have been [reviewed by Louisiana educators](#) to ensure their alignment to the [Louisiana Student Standards](#) and appropriateness for Louisiana students;
- measurement of the full range of student performance, including the performance 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.

### 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 students need 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.

## ASSESSMENT DESIGN

### Supporting Key Shifts in Science Instruction

The spring 2019 operational test that will assess a student’s understanding of the grade 4 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 skills and knowledge students are expected to master by the end of the course.

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

**Shift: 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 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)**

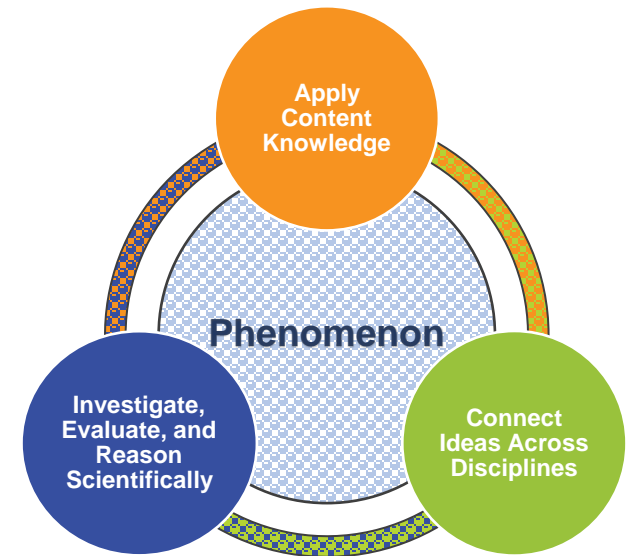
**In the classroom**, students develop a coherent and scientifically-based view of the world, they must make connections across the domains of science (life science, physical science, earth and space science, environmental science, and engineering, technology, and applications of science). These connections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

**On the 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, task sets, and standalone items. A scientific **phenomenon** provides the anchor for each 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, and the task set culminates with an extended-response task. Each test includes **standalone items** which are not part of an item set or task set.

The LEAP 2025 Science Grade 4 test will contain item sets, stand-alone items, and one task 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.
- **Extended Response (ER)**: asks students to write a response that expresses the students' ability to apply all three dimensions of the LSS for Science and will be scored using a 6-point rubric.

### Test Design

The LEAP 2025 Science Grade 4 test is comprised of five item sets, sixteen standalone items, and one task set across three sessions. The table below provides information about the test design by session. All LEAP 2025 tests are **timed**; the time allotted for each session was determined based on careful analysis of several data points from the field test, including student item completion rates and the differences of the minimum and maximum time spent on each item. The session times are padded with time overage to account for students who may take more time than most students, but do not require test accommodations for extended time.

Grade 4 Science			
Test Session	Component	Points	Time Allowed
Session 1	3 Item Sets	18	75 minutes
	Standalone Items	4	
	FT Standalone Item	N/A	
Session 2	Task Set	12	70 minutes
	Standalone Items	4	
	FT Item Set and Standalone Item	N/A	
Session 3	2 Item Sets	12	70 minutes
	Standalone Items	11	
	FT Standalone Items	N/A	
<b>Total Operational</b>	5 Item Sets, 1 Task Set, 16 Standalones	61	3 hours 35 minutes

**NOTE:** The test will contain embedded field-test (FT) questions (one item set and four standalone items). The field-test questions do **not** count toward a student's final score on the test and may be placed anywhere in the designated session; they provide information that will be used to develop future test forms.

## REPORTING CATEGORIES

All Louisiana Student Standards for Science are eligible for assessment. The LEAP 2025 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 task set, which contains the extended-response question, may assess any of the LSS for science from year to year. The extended-response question is reported in the overall score, but not as part of any reporting category. The table below shows the reporting category titles and descriptions as well as the PEs associated with each reporting category.

Grade 4		
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 Descriptors

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 studies 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 studies 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 studies 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 studies 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 studies in this content area.

## TEST ADMINISTRATION

All LEAP 2025 tests are computer-based (CBT), but districts may choose to administer paper-based tests (PBT) for grade 4. School systems have until October 31, 2018 to choose CBT or PBT. The **computer-based testing window opens April 1, 2019 and runs through May 3, 2019**. Your school or district test coordinator will communicate your school's testing schedule.

### 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., ELA Session 1 taken before ELA Session 2)

We also recommend

- 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 in a day to an individual student.

For more information about the scheduling of the CBT and online administration policies, refer to the [CBT Guidance](#) document, found in the LDOE [Assessment library](#).

The table below shows the PBT schedule for grade 4.

PBT Testing Window: April 29, 2019 – May 3, 2019		Session Time
<b>Day 1</b> <b>April 29</b>	English Language Arts Session 1: Literary Analysis Task <b>and</b> a passage set with one text <b>OR</b> Research Simulation Task	90 minutes
	Mathematics Session 1	75 minutes
<b>Day 2</b> <b>April 30</b>	English Language Arts Session 2: Research Simulation Task <b>OR</b> Narrative Writing Task <b>and</b> a passage set with one text or a pair of related texts	90 minutes
	Mathematics Session 2	85 minutes
<b>Day 3</b> <b>May 1</b>	English Language Arts Session 3: Reading Literary and Informational Texts	60 minutes
	Mathematics Session 3	75 minutes

<b>Day 4 May 2</b>	Science Session 1: Item Sets and Standalone Items	75 minutes
	Science Session 2: Item Set and Task Set	70 minutes
	Science Session 3: Item Sets and Standalone Items	70 minutes
<b>Day 5 May 3</b>	Social Studies Session 1: Item Sets and Standalone Items	75 minutes
	Social Studies Session 2: Item Sets and Standalone Items	75 minutes

### Testing Materials

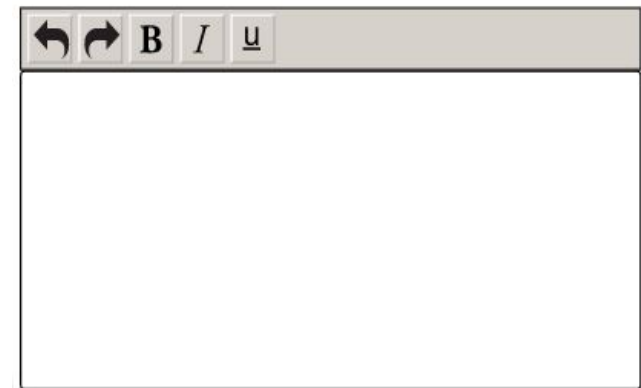
All students must receive scratch paper and two pencils from their test administrator.








### Computer-Based Tests

Students will enter their answers into the online testing system. When composing their written responses for science constructed- or extended-response items, 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 following online tools allow students 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, to practice using the online tools so students are well prepared to navigate the online testing system.**

### Paper-Based Tests

Students taking the paper-based tests will enter all answers in their test booklets. There will be no separate answer documents. Instructions for how to manage the test booklets will be outlined in the Test Administration Manual.

**Multiple-choice** questions for grade 4 have four answer options. Students will shade the bubble of the **one** correct answer.

Option A

Option B

Option C

Option D

**Multiple-select** questions for grade 4 have five options. Students will fill in the number of correct answers identified in the stem of the question. **The number of correct answers will vary from task to task.** The sample asks for two correct answers.

Option A

Option B

Option C

Option D

Option E

### General Guidelines

The following information presents guidelines for marking/writing in the LEAP 2025 Science Test booklet.

- Students are encouraged to mark the stimulus and questions in the test booklet (e.g., highlight or underline evidence, annotate the stimulus document(s), circle key words in the questions, etc.), especially as part of their preparation in responding to the extended-response portion of the task.
- Students may use yellow highlighters to highlight text in the test booklet.
- Highlighting text in options and placing an X to the right of the text in an option are recommended ways for students to eliminate options. However, crossing out options could create scoring issues if students mark through answer circles.
- When students are answering items requiring written responses, they should make sure to write their responses in the space(s) provided. Any information written outside the space or which has been scratched out in the printed test booklet will not be scored.

## SAMPLE TEST ITEMS

Before the standalone items, the item set, and the task set, 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 set, as well as rubrics for the CRs and ERs are included.

### Standalone Items

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](#).

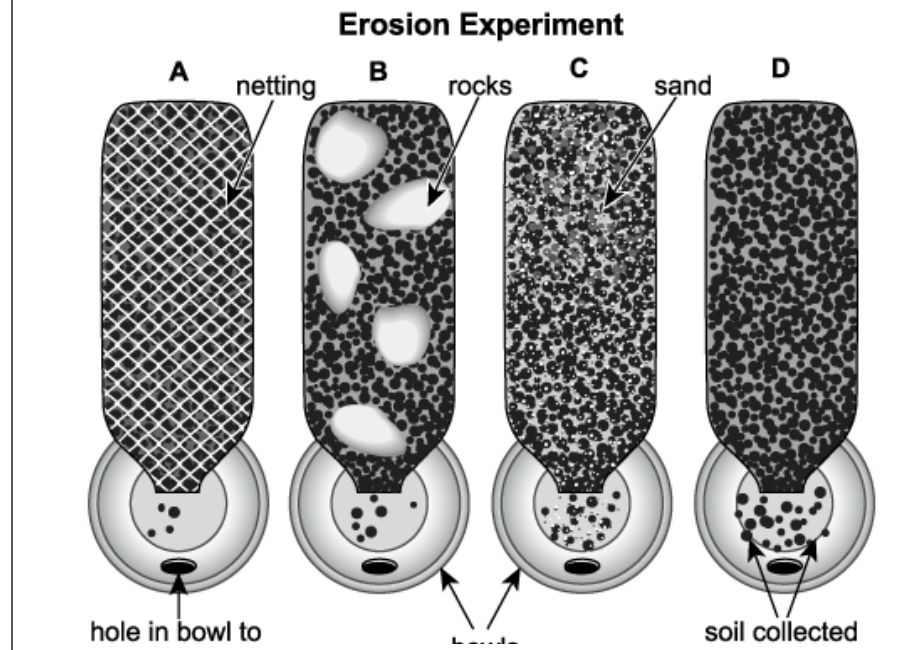
**Multiple-Choice Item**

*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?

- Add netting, because it kept the greatest amount of soil in the bottle.\*
- Add sand, because some of it moved into the bowl along with the soil.
- Add rocks, because only a few were needed in order to keep a lot of soil in the bottle.
- 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 (\*) 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.

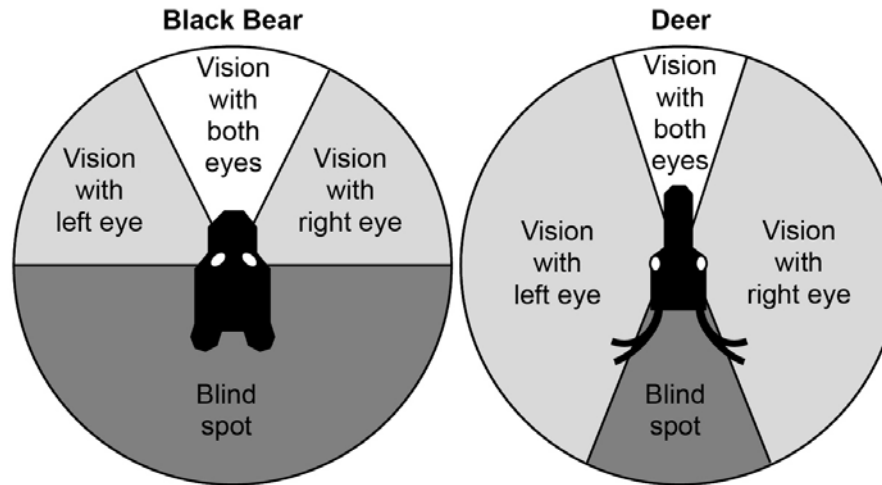
Table 1 shows some information about black bears and deer.

**Table 1. Black Bear and Deer Facts**

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

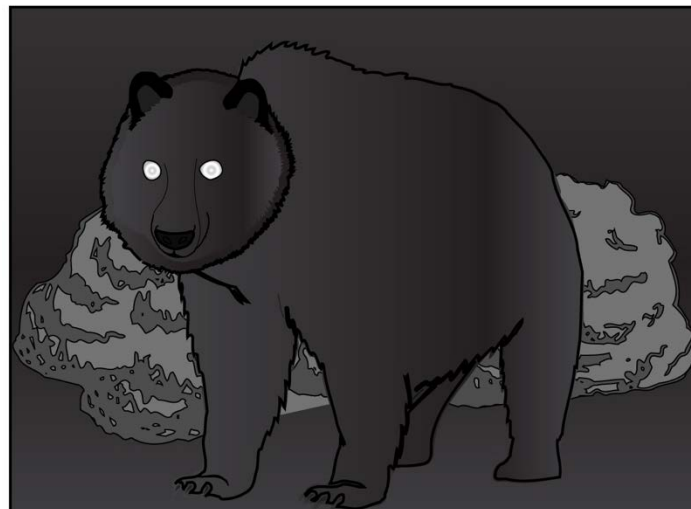
A blind spot is a place where an animal cannot see. Figure 1 shows the blind spots of a black bear and a deer.

**Figure 1. Black Bear and Deer Vision**



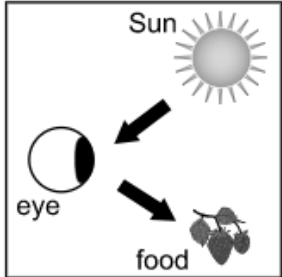
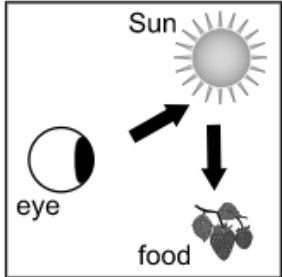
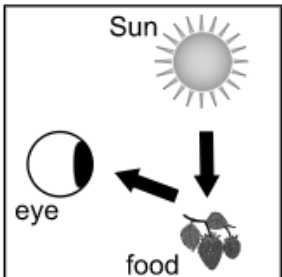
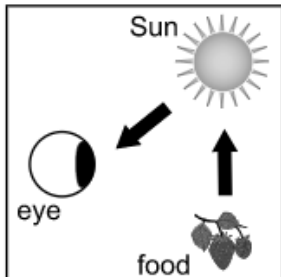
Black bears can see well at night. This is because there is a thin layer of shiny material on the insides of their eyes. This helps their eyes capture more light and makes their eyes appear to glow at night, as shown in Figure 2.

**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?

A. 
 B. 
 C. 
 D. 

*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 <b>not</b> 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.

**TASK: 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 (\*) denotes correct answer(s).



**Stimulus Materials:**

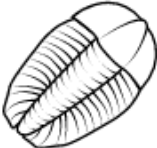



Use the information about the ages of Louisiana soil and fossils and your knowledge of science to answer the questions.

**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.

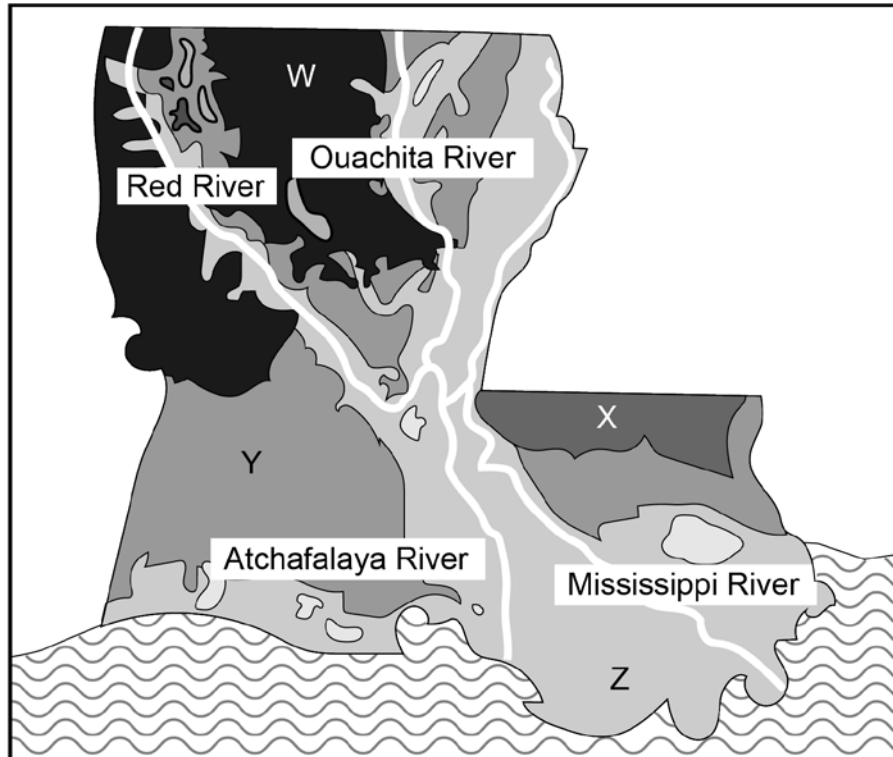
Some of the fossils found in Louisiana are shown in Table 1.

**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	
<b>W</b> 66 mya to 5.3 mya	<b>Z</b> 12,000 years ago to present
<b>X</b> 5.3 mya to 2.6 mya	open water
<b>Y</b> 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 Library

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

### Practice Test Library

- [LEAP 2025 Grade 4 PBT Practice Test](#) and [Answer Key](#) and [CBT Practice Test Answer Key](#): helps prepare students for the spring assessment, includes answer keys, scoring rubrics, and alignment information
- [LEAP 2025 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 Library

- [2018-2019 Louisiana Assessment Calendar](#): includes information on testing windows for test administrations
- [LEAP Accessibility and Accommodations Manual](#): provides information about accessibility and accommodations
- [LEAP 2025 Technology Enhanced Item Types](#): provides a summary of technology enhanced items students may encounter in any CBT across courses and grade levels

### eDIRECT

- includes tutorials, manuals, and user guides
- EAGLE: part of the LEAP 360 system which allows teachers to integrate high-quality questions into daily lessons through teacher created tests, premade assessments, and items for small group instruction

### INSIGHT™

- LEAP 2025 Science Grade 4 CBT Practice Test: (student access January 2019) helps prepare students for the spring assessment
- Online Tools Training: allows students to become familiar with the online testing platform and its available tools

### K-12 Science Planning Resources Library

- [K-12 Louisiana Student Standards for Science \(2017\)](#): provides the performance expectations for all grades
- [Grade 4 Sample Scope and Sequence](#): assists educators in transitioning to the new science standards
- [Grade 4 Teacher Toolbox](#): contains resources and supporting instructional material
- Instructional science tasks: [Erosion](#), [Seasons](#), [Redwood Forests](#), [Energy Transformations](#), [Loss of Species](#) [Loss of Ecosystem](#)

### Contact Us

- [AskLDOE](#): electronic ticket system
- [assessment@la.gov](mailto:assessment@la.gov) for assessment questions
- [classroomsupporttoolbox@la.gov](mailto:classroomsupporttoolbox@la.gov) for curriculum and instruction questions

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

APPENDIX

Update Log		
Date	Page	Summary of Changes
10/2/18	1	Added Appendix to list of internal links
	3	Added Test Design table
	23	Updated Resource links
10/31/18	3	Added test session times to the Test Design table
	5, 6	Added PBT Administration Schedule
4/2/19	4	Added Reporting Categories table
4/22/19	4	Provided more information about reporting and assessed content