LOUISIANA DEPARTMENT OF EDUCATION

Office of Assessments, Accountability, and Analytics

Grade 8 Science Achievement-Level Descriptors

This document includes the following:

- LEAP 2025 Science Assessments Support Key Shifts in Science Instruction
- Achievement-Level Definitions
- Achievement-Level Descriptors

LEAP 2025 Science Assessments Support Key Shifts in Science Instruction

The operational test will assess a student's understanding of the grade 8 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 that 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.

Achievement-Level Definitions

Achievement-level definitions briefly describe the expectations for student performance at each of Louisiana's five achievement levels. The achievement levels are part of Louisiana's cohesive assessment system and indicate a student's ability to demonstrate proficiency on the Louisiana student standards defined for a specific course.

The following list identifies the achievement-level definitions for the LEAP 2025 assessment program.

- **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

Achievement-Level Descriptors

Achievement-level descriptors (ALDs) are content specific and describe the knowledge, skills, and processes that students typically demonstrate at each achievement level. The Achievement-Level Descriptors Table, shown below, is color-coded to highlight the key shifts in science instruction built into the LEAP 2025 science assessments. The codes are: **SEP = blue; DCI = orange; CCC = green**

Science and Engineering Practices (SEP) are the practices that scientists and engineers use when investigating real world phenomena and designing solutions to problems. There are eight science and engineering practices that apply to all grade levels and content areas.

1. Asking questions (science) and defining problems (engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematical and computational thinking
6. Constructing explanations (science) and designing solutions (engineering)
7. Engaging in argument with evidence
8. Obtaining, evaluating, and communicating information

Crosscutting Concepts (CCC) are common themes that have application across all disciplines of science and allow students to connect learning within and across grade levels or content areas. The seven crosscutting concepts apply to all grade levels and content areas.

1. Patterns (PAT)
2. Cause and effect (C/E)
3. Scale, proportion, and quantity (SPQ)
4. Systems and models (SYS)
5. Energy and matter (E/M)
6. Structure and function (S/F)
7. Stability and change (S/C)

Grade 8 Achievement- Level Descriptors

Performance Expectation	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
Investigate				
8-MS-PS1-3 Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. CCC: S/F SEP: 8	Use information to construct an explanation about how synthetic materials come from natural resources and impact society.	Use information to describe that synthetic materials come from natural resources and their impact on society.	Use information to describe synthetic materials that come from natural resources.	Identify synthetic materials that come from natural resources.
8-MS-PS1-6 Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. CCC: E/M SEP: 6	Design a project to construct, test, and/or modify a device that either releases or absorbs thermal energy by chemical processes.	Evaluate a design project to construct, test, and/or modify a device that either releases or absorbs thermal energy by chemical processes.	Identify a design project to construct, test, and/or modify a device that either releases or absorbs thermal energy by chemical processes.	Identify variables in a design project to construct, test, and/or modify a device that either releases or absorbs thermal energy by chemical processes.
8-MS-PS3-3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. CCC: E/M SEP: 6	Apply scientific ideas to design, construct, and/or test a device that either minimizes or maximizes thermal energy transfer.	Apply scientific ideas to evaluate a device that either minimizes or maximizes thermal energy transfer.	Apply scientific ideas to describe a device that either minimizes or maximizes thermal energy transfer.	Apply scientific ideas to identify a device that either minimizes or maximizes thermal energy transfer.

Performance Expectation	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
8-MS-ESS3-2 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. CCC: PAT SEP: 4	Use patterns found in data on natural hazards to construct claims about future catastrophic events and inform the development of technologies to mitigate their effects.	Analyze and interpret patterns in data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	Analyze and interpret patterns in qualitative data on natural hazards to forecast future catastrophic events and/or inform the development of technologies to mitigate their effects.	Identify patterns in qualitative data on natural hazards to forecast future catastrophic events or inform the development of technologies to mitigate their effects.
8-MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing human impact on the environment. CCC: C/E SEP: 6	Apply scientific ideas to design, construct, and/or test a method for monitoring and minimizing human impact on the environment.	Apply scientific ideas to evaluate a method for monitoring and minimizing human impact on the environment.	Apply scientific ideas to describe a method for monitoring and minimizing human impact on the environment.	Apply scientific ideas to identify a method for monitoring and minimizing human impact on the environment.
8-MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. CCC: C/E SEP: 6	Evaluate a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	Support a scientific explanation for how environmental and genetic factors influence the growth of organisms.	Identify a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

Performance Expectation	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
Evaluate				
8-MS-PS3-5 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. CCC: E/M SEP: 7	Evaluate and defend arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	Construct and use arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	Describe an observation based on evidence to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	Identify an observation to support the claim that when the kinetic energy of an object changes, some other change in energy will occur at the same time.
8-MS-ESS2-3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and sea floor structures to provide evidence of the past plate motions. CCC: PAT SEP: 4	Use data on the distribution of fossils and rocks, continental shapes, and sea floor structures to construct explanations about past plate motions.	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and sea floor structures to provide evidence of the past plate motions.	Analyze and interpret qualitative data on the distribution of fossils and rocks, continental shapes, and sea floor structures to provide evidence of the past plate motions.	Identify patterns in the distribution of fossils and rocks, continental shapes, or sea floor structures to provide evidence of the past plate motions.

Performance Expectation	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
8-MS-LS1-4 Construct and use argument(s) based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of survival and successful reproduction of animals and plants respectively. CCC: C/E SEP: 7	Evaluate argument(s) based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of survival and successful reproduction of animals and plants respectively.	Construct and use argument(s) based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of survival and successful reproduction of animals and plants respectively.	Describe an observation based on evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of survival and successful reproduction of animals and plants respectively.	Identify an observation to support an explanation that characteristic animal behaviors or specialized plant structures affect the probability of survival and successful reproduction of animals and plants respectively.
8-MS-LS4-1 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. CCC: PAT SEP: 4	Use data to construct explanations about patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	Analyze and interpret qualitative data for patterns in the fossil record that document the existence, diversity, extinction, and/or change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	Identify qualitative data that describe patterns in the fossil record that document the existence, diversity, extinction, or change of life forms throughout the history of life on Earth.

Performance Expectation	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
8-MS-LS4-3 Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. CCC: PAT SEP: 4	Analyze and interpret multiple displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to construct explanations about relationships not evident in the fully formed anatomy.	Analyze multiple displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.	Analyze a display of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.	Identify patterns in pictorial data that compare the similarities in the embryological development between species to identify relationships not evident in the fully formed anatomy.
8-MS-LS4-6 Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations of species over time. CCC: C/E SEP: 5	Use mathematical representations to construct explanations of how natural selection may lead to increases and decreases of specific traits in populations of species over time.	Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations of species over time.	Analyze graphical representations of mathematical relationships of how natural selection may lead to increases and decreases of specific traits in populations of species over time.	Use simple mathematical representations to identify relationships of how natural selection may lead to increases and decreases of a trait in a population of a species over time.
Reason Scientifically				
8-MS-PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures. CCC: SPQ SEP: 2	Develop models to construct explanations about the atomic composition of simple molecules and extended structures.	Develop models to describe the atomic composition of simple molecules and extended structures.	Use a model to describe the atomic composition of simple molecules and/or extended structures.	Use a model to identify the atomic composition of simple molecules and/or extended structures.

Performance Expectation	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
8-MS-ESS1-4 Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's geologic history. CCC: SPQ SEP: 6	Evaluate a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's geologic history.	Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's geologic history.	Support a scientific explanation with evidence from rock strata for how the geologic time scale is used to organize Earth's geologic history.	Identify a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's geologic history.
8-MS-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. CCC: S/C SEP: 2	Develop models to construct explanations about the cycling of Earth's materials and the flow of energy that drives this process over time.	Develop models to describe the cycling of Earth's materials and the flow of energy that drives this process over time.	Use a model to describe the cycling of Earth's materials and the flow of energy that drives this process over time.	Use a model to identify the cycling of Earth's materials and the flow of energy that drives this process over time.
8-MS-ESS2-2 Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. CCC: SPQ SEP: 6	Evaluate an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	Support an explanation for how geoscience processes have changed Earth's surface at varying time and spatial scales.	Identify an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

Performance Expectation	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
8-MS-ESS3-1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. CCC: C/E SEP: 6	Evaluate a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	Support a scientific explanation for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	Identify a scientific explanation based on evidence for how the uneven distributions of Earth's natural resources are the result of geoscience processes.
8-MS-LS3-1 Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. CCC: S/F SEP: 2	Develop and use a model to construct explanations to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	Use a model to describe how structural changes to genes may affect proteins and may result in harmful, beneficial, or neutral effects on the structure and function of the organism.	Use a model to identify that changes to genes may affect proteins and may result in changes to the structure and function of the organism.

Performance Expectation	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
8-MS-LS4-2 Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. CCC: PAT SEP: 6	Evaluate an explanation based on scientific ideas for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.	Construct an explanation based on scientific ideas for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.	Support an explanation based on scientific ideas for the anatomical similarities or differences among modern organisms or between modern and fossil organisms to infer evolutionary relationships.	Identify an explanation based on scientific ideas for the anatomical similarities or differences among modern organisms or between modern and fossil organisms to infer evolutionary relationships.