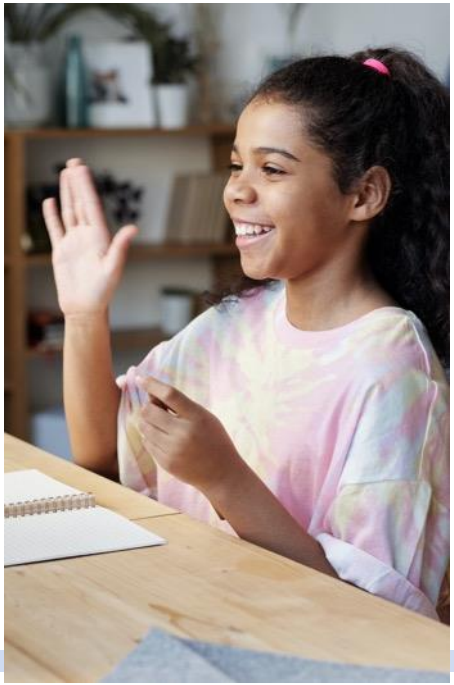
MAINE DEPARTMENT OF EDUCATION
ASSESSMENT TEAM

Understanding & Utilizing Maine Science Assessment Reports

Presented by: Krista Averill, Assessment Coordinator

Maine Department of Education

Mission & Vision



To promote the best learning opportunities for all Maine students by providing information, guidance, and support to our schools, educators, and leaders and by providing adequate and equitable school funding and resources.

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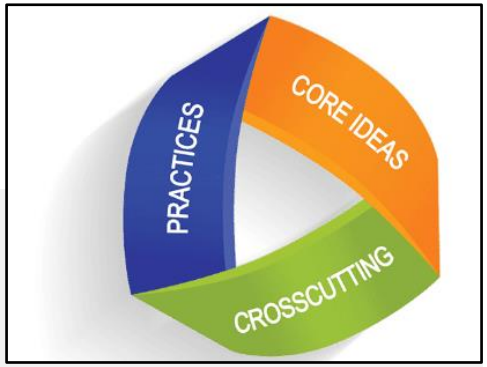
Agenda



Assessment Structure

Science & Engineering Maine Learning Results and the Next Generation Science Standards

Assessment Blueprint

Achievement Level Descriptors

Reports

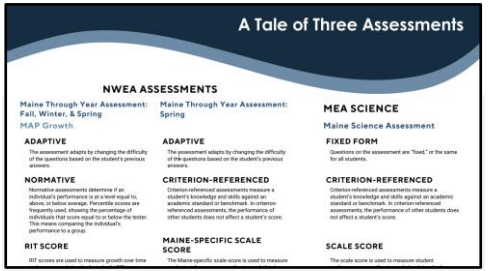
Individual Student Report

School Aggregated Report

SAU Aggregated Report

Student Score Data File (CSV)

Statewide Results



Additional Information

Text-to-Speech

Constructed Response Item Statistics

Comparison to NWEA's Assessments

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Standards

Next Generation Science Standards

Maine Learning Results

NGSS

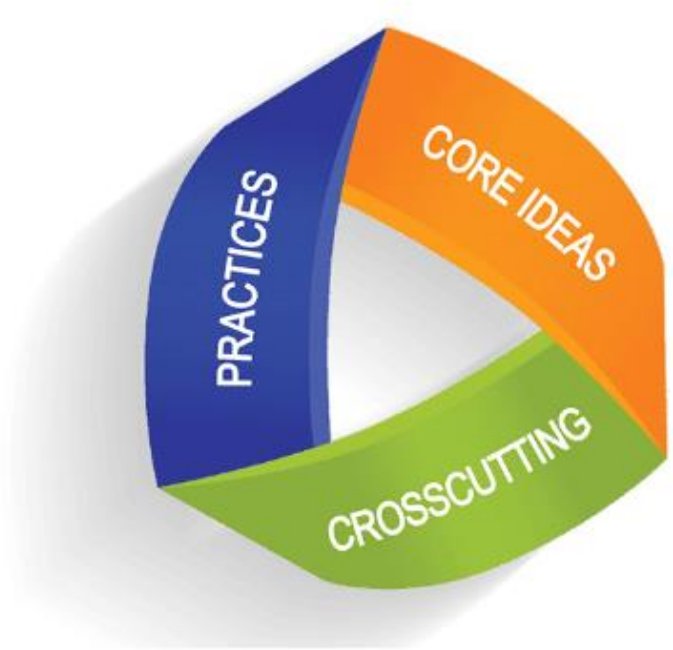
Developed by a consortium of states and and led by the National Research Council, the National Science Teachers Association, and the American Association for the Advancement of Science

Designed to prepare students for college and career readiness in STEM fields

Maine Learning Results in Science & Engineering

NGSS “packaged differently”

Three-Dimensional Standards



Science & Engineering Practices (SEPs)

Crosscutting Concepts (CCCs)

Disciplinary Core Ideas (DCIs)

National Academies of Sciences, Engineering, and Medicine. 2012. A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Washington, DC: The National Academies Press. https://doi.org/10.17226/13165. Free PDF download: https://nap.nationalacademies.org/read/13165/chapter/1

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> The actual doing of science or engineering can pique students' curiosity, capture their interest, and motivate their continued study.

Science & Engineering Practices

Science & Engineering Practices (SEPs)

PRACTICES FOR K-12 SCIENCE CLASSROOMS

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

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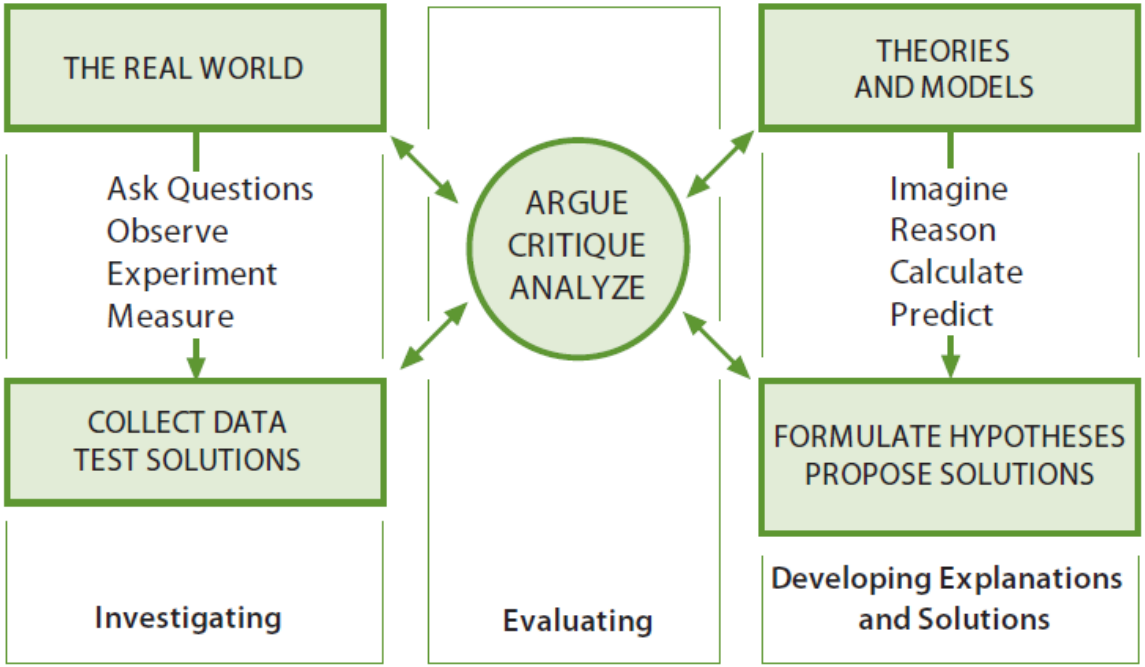
The Three Spheres of Activity for Scientists and Engineers



SEP Groupings in Maine Science Assessment Design

Investigate

- Asking questions
- Planning and carrying out investigations

Evaluate

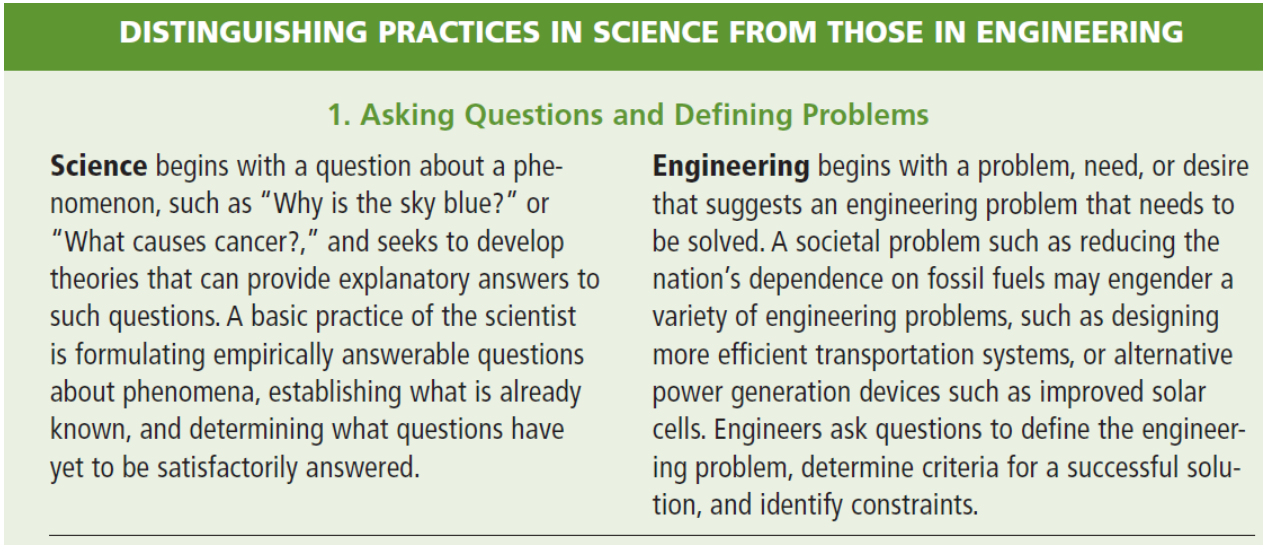
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Engaging in argument from evidence

Reason Scientifically

- Developing and using models
- Constructing explanations

Science & Engineering Practices

In *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas:*



DISTINGUISHING PRACTICES IN SCIENCE FROM THOSE IN ENGINEERING

1. Asking Questions and Defining Problems

Science begins with a question about a phenomenon, such as "Why is the sky blue?" or "What causes cancer?," and seeks to develop theories that can provide explanatory answers to such questions. A basic practice of the scientist is formulating empirically answerable questions about phenomena, establishing what is already known, and determining what questions have yet to be satisfactorily answered.

Engineering begins with a problem, need, or desire that suggests an engineering problem that needs to be solved. A societal problem such as reducing the nation's dependence on fossil fuels may engender a variety of engineering problems, such as designing more efficient transportation systems, or alternative power generation devices such as improved solar cells. Engineers ask questions to define the engineering problem, determine criteria for a successful solution, and identify constraints.

Science & Engineering Practices

In *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas:*

GOALS

By grade 12, students should be able to

- Ask questions about the natural and human-built worlds—for example: Why are there seasons? What do bees do? Why did that structure collapse? How is electric power generated?
- Distinguish a scientific question (e.g., Why do helium balloons rise?) from a nonscientific question (Which of these colored balloons is the prettiest?).
- Formulate and refine questions that can be answered empirically in a science classroom and use them to design an inquiry or construct a pragmatic

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Science & Engineering Practices

In *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas:*

PROGRESSION

Students at any grade level should be able to ask questions of each other about the texts they read, the features of the phenomena they observe, and the conclusions they draw from their models or scientific investigations. For engineering, they should ask questions to define the problem to be solved and to elicit ideas that lead to the constraints and specifications for its solution. As they progress across the grades, their questions should become more relevant, focused, and sophisti-cated. Facilitating such evolution will require a classroom culture that respects and values good questions, that offers students opportunities to refine their questions

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Crosscutting Concepts (CCCs)

- Patterns
- Cause and effect
- Scale, proportion, and quantity
- Systems and system models
- Energy and matter
- Structure and function
- Stability and change

“These concepts should become common and familiar touchstones across the disciplines and grade levels. Explicit reference to the concepts… can help students develop a cumulative, coherent, and usable understanding of science and engineering.”

Crosscutting Concepts

Crosscutting Concepts

In *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas:*

Patterns

Patterns exist everywhere—in regularly occurring shapes or structures and in repeating events and relationships. For example, patterns are discernible in the symmetry of flowers and snowflakes, the cycling of the seasons, and the repeated base pairs of DNA. Noticing patterns is often a first step to organizing and asking scientific questions about why and how the patterns occur.

One major use of pattern recognition is in classification, which depends on careful observation of similarities and differences; objects can be classified into groups on the basis of similarities of visible or microscopic features or on the basis of similarities of function. Such classification is useful in codifying relationships and organizing a multitude

Crosscutting Concepts

In *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas:*

Progression

Human beings are good at recognizing patterns; indeed, young children begin to recognize patterns in their own lives well before coming to school. They observe, for example, that the sun and the moon follow different patterns of appearance in the sky. Once they are students, it is important for them to develop ways to recognize, classify, and record patterns in the phenomena they observe. For example, elementary students can describe and predict the patterns in the seasons of the year; they can observe and record patterns in the similarities and differences between parents and their offspring. Similarly, they can investigate the characteristics that allow classification of animal types (e.g., mammals, fish, insects), of plants (e.g., trees, shrubs, grasses), or of materials (e.g., wood, rock, metal, plastic)

Disciplinary Core Ideas (DCIs)

- Have broad importance across multiple science disciplines
- Provide a key tool for understanding or investigating complex ideas and solving problems
- Relate to students' interests and life experiences or societal concerns
- Are teachable and learnable over multiple grades at increasing levels of complexity
- Not an exhaustive list of science and engineering learning to be attained— an expression of the key concepts all citizens should be familiar with

CORE AND COMPONENT IDEAS IN THE PHYSICAL SCIENCES

Core Idea PS1: Matter and Its Interactions

- PS1.A: Structure and Properties of Matter
- PS1.B: Chemical Reactions
- PS1.C: Nuclear Processes

Core Idea PS2: Motion and Stability: Forces and Interactions

- PS2.A: Forces and Motion
- PS2.B: Types of Interactions
- PS2.C: Stability and Instability in Physical Systems

Core Idea PS3: Energy

- PS3.A: Definitions of Energy
- PS3.B: Conservation of Energy and Energy Transfer
- PS3.C: Relationship Between Energy and Forces
- PS3.D: Energy in Chemical Processes and Everyday Life

Core Idea PS4: Waves and Their Applications in Technologies for Information Transfer

- PS4.A: Wave Properties
- PS4.B: Electromagnetic Radiation
- PS4.C: Information Technologies and Instrumentation

Disciplinary Core Ideas:

Physical Sciences

A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas

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CORE AND COMPONENT IDEAS IN THE LIFE SCIENCES

Core Idea LS1: From Molecules to Organisms: Structures and Processes

- LS1.A: Structure and Function
- LS1.B: Growth and Development of Organisms
- LS1.C: Organization for Matter and Energy Flow in Organisms
- LS1.D: Information Processing

Core Idea LS2: Ecosystems: Interactions, Energy, and Dynamics

- LS2.A: Interdependent Relationships in Ecosystems
- LS2.B: Cycles of Matter and Energy Transfer in Ecosystems
- LS2.C: Ecosystem Dynamics, Functioning, and Resilience
- LS2.D: Social Interactions and Group Behavior

Core Idea LS3: Heredity: Inheritance and Variation of Traits

- LS3.A: Inheritance of Traits
- LS3.B: Variation of Traits

Core Idea LS4: Biological Evolution: Unity and Diversity

- LS4.A: Evidence of Common Ancestry and Diversity
- LS4.B: Natural Selection
- LS4.C: Adaptation
- LS4.D: Biodiversity and Humans

Disciplinary Core Ideas:

Life Sciences

A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas

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CORE AND COMPONENT IDEAS IN EARTH AND SPACE SCIENCES

Core Idea ESS1: Earth's Place in the Universe

- ESS1.A: The Universe and Its Stars
- ESS1.B: Earth and the Solar System
- ESS1.C: The History of Planet Earth

Core Idea ESS2: Earth's Systems

- ESS2.A: Earth Materials and Systems
- ESS2.B: Plate Tectonics and Large-Scale System Interactions
- ESS2.C: The Roles of Water in Earth's Surface Processes
- ESS2.D: Weather and Climate
- ESS2.E: Biogeology

Core Idea ESS3: Earth and Human Activity

- ESS3.A: Natural Resources
- ESS3.B: Natural Hazards
- ESS3.C: Human Impacts on Earth Systems
- ESS3.D: Global Climate Change

Disciplinary Core Ideas:

Earth & Space Sciences

A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas

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Disciplinary Core Ideas

In *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas:*

Core Idea PS3 **Energy**

How is energy transferred and conserved?

Interactions of objects can be explained and predicted using the concept of transfer of energy from one object or system of objects to another. The total energy within a defined system changes only by the transfer of energy into or out of the system.

PS3.A: DEFINITIONS OF ENERGY

What is energy?

That there is a single quantity called energy is due to the remarkable fact that a

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Disciplinary Core Ideas

In *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas:*

Grade Band Endpoints for PS3.A

By the end of grade 2. [Intentionally left blank.]

By the end of grade 5. The faster a given object is moving, the more energy it possesses. Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (Boundary: At this grade level, no attempt is made to give a precise or complete definition of energy.)

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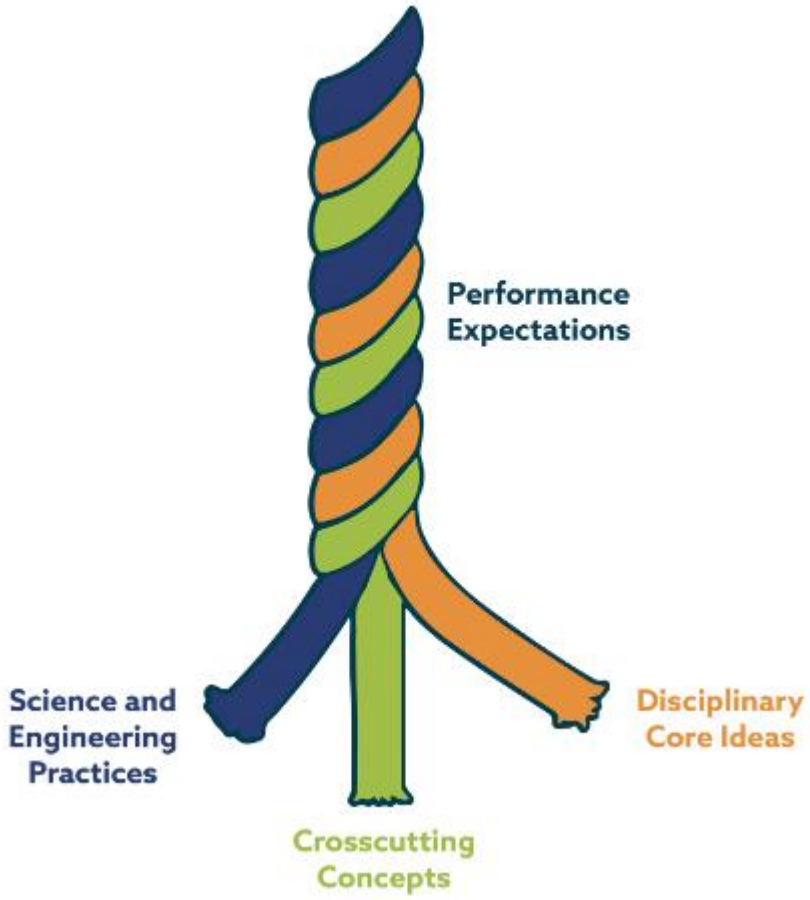
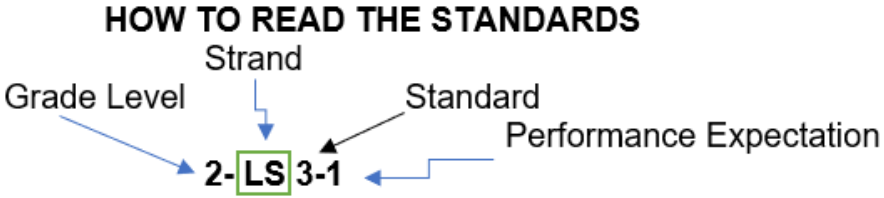


Performance Expectations combine the three dimensions in statements about what students should know and be able to do by the end of instruction.

NGSS Lead States (2013). *Next Generation Science Standards: For States, By States*. Washington, DC: The National Academies Press.

Science & Engineering Maine Learning Results

Next Generation Science Standards “packaged differently”



COLOR SCHEME

Science & Engineering Practices (blue)
Disciplinary Core Ideas (orange)
Crosscutting Concepts (green)

Science & Engineering Maine Learning Results

Strand	Life Sciences (LS)		
Standard	LS1: From Molecules to Organisms: Structures and Processes		
	Childhood		
	Grade 3	Grade 4	Grade 5
Performance Expectations	**3-LS1-1 Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.** Further Explanation: Changes organisms go through during their life form a pattern. Potential Maine connections include frogs in vernal pools, Atlantic salmon life cycle and gestation vs. metamorphosis. Developing and Using Models, Growth and Development of Organisms, Patterns	**4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.** Further Explanation: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin found in Maine plants and animals. Engaging in Argument from Evidence, Structure and Function, Systems and System Models **4-LS1-2 Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.** Further Explanation: Emphasis	**5-LS1-1 Support an argument that plants get the materials they need for growth chiefly from air and water.** Further Explanation: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil. Investigate Maine plants. Engaging in Argument from Evidence, Organization for Matter and Energy Flow in Organisms, Energy and Matter

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Next Generation Science Standards

Students who demonstrate understanding can:

5-LS1-1. **Support an argument that plants get the materials they need for growth chiefly from air and water.** [Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • Support an argument with evidence, data, or a model.	**LS1.C: Organization for Matter and Energy Flow in Organisms** • Plants acquire their material for growth chiefly from air and water.	**Energy and Matter** • Matter is transported into, out of, and within systems.

Connections to other DCIs in fifth grade:
5.PS1.A

Articulation of DCIs across grade-levels:
K.LS1.C ; **2.LS2.A** ; **MS.LS1.C**

Common Core State Standards Connections:

ELA/Literacy -

RI.5.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. *(5-LS1-1)*
RI.5.9	Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1)
W.5.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1)

Mathematics -

MP.2	Reason abstractly and quantitatively. *(5-LS1-1)*
MP.4	Model with mathematics. *(5-LS1-1)*
MP.5	Use appropriate tools strategically. *(5-LS1-1)*
5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. *(5-LS1-1)*

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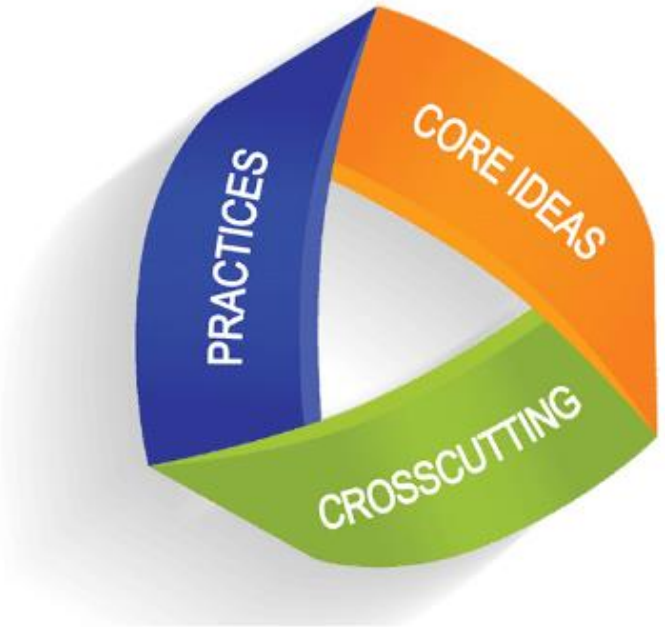
The Maine Science Assessment contains questions that, together, assess **all three dimensions** to measure student understanding of the Maine Learning Results and the NGSS.



Blueprints

Coverage of Standards

Item (Question) Types

Item Clusters vs. Standalone Items

Blueprints

- Specify targets for the minimum and maximum number of operational score points aligned to each science discipline or topic
- All items aligned to a specific NGSS performance expectation
- Purposeful and fluid incorporation of both Disciplinary Core Ideas (DCI) and Science and Engineering Practices (SEP)
- No specific targets for the inclusion of Crosscutting Concepts (CCC)
- Any SEP and CCC may be assessed with any DCI
- Designed to ensure that the assessment measures the MLRs in a comprehensive and balanced way across multiple years
- Not every DCI is measured on the assessment every year

Blueprints

Grade 5 Blueprint

Grade 8 Blueprint

High School Blueprint

Science Topic	Performance Expectations (PE)	Target Percentage	Target Operational Items	
			Min	Max
Matter and Energy in Organisms and Ecosystems	5-PS3-1 5-LS1-1 5-LS2-1	30%	10	12
Structure and Properties of Matter	5-PS1-1 5-PS1-2 5-PS1-3 5-PS1-4	30%	10	12
Earth's Systems and Space Systems: Stars and the Solar System	5-PS2-1 5-ESS1-1 5-ESS1-2 5-ESS2-1 5-ESS2-2 5-ESS3-1	40%	13	15
	Total	**100%**	**36**	

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Where do the questions come from?

- The New Meridian Science Exchange, a licensable collection of science items contributed by states from their NGSS-aligned assessments as well as items specially developed by New Meridian

- Thoroughly reviewed by New Meridian's science specialists and accessibility, accommodations, and fairness specialist, as well as by the Maine Department of Education and educators, prior to use in Maine

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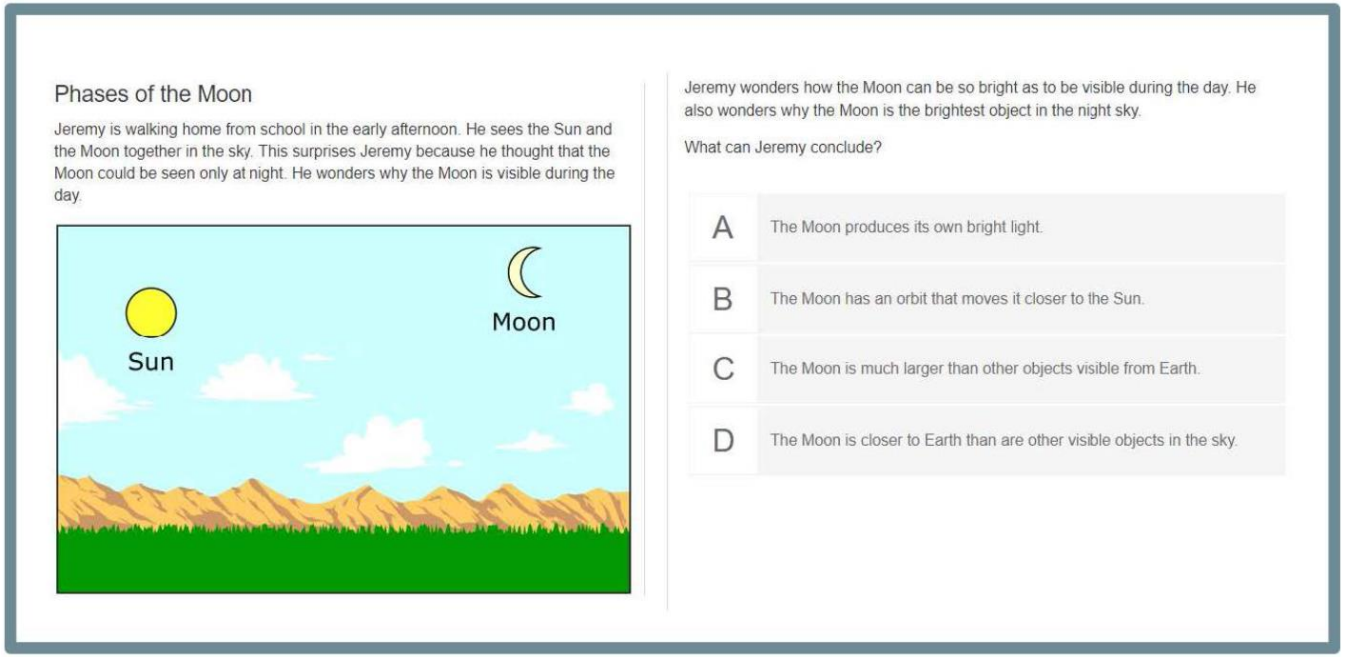
Item Types: Selected Response



Phases of the Moon

Jeremy is walking home from school in the early afternoon. He sees the Sun and the Moon together in the sky. This surprises Jeremy because he thought that the Moon could be seen only at night. He wonders why the Moon is visible during the day.

Jeremy wonders how the Moon can be so bright as to be visible during the day. He also wonders why the Moon is the brightest object in the night sky.

What can Jeremy conclude?

A The Moon produces its own bright light.

B The Moon has an orbit that moves it closer to the Sun.

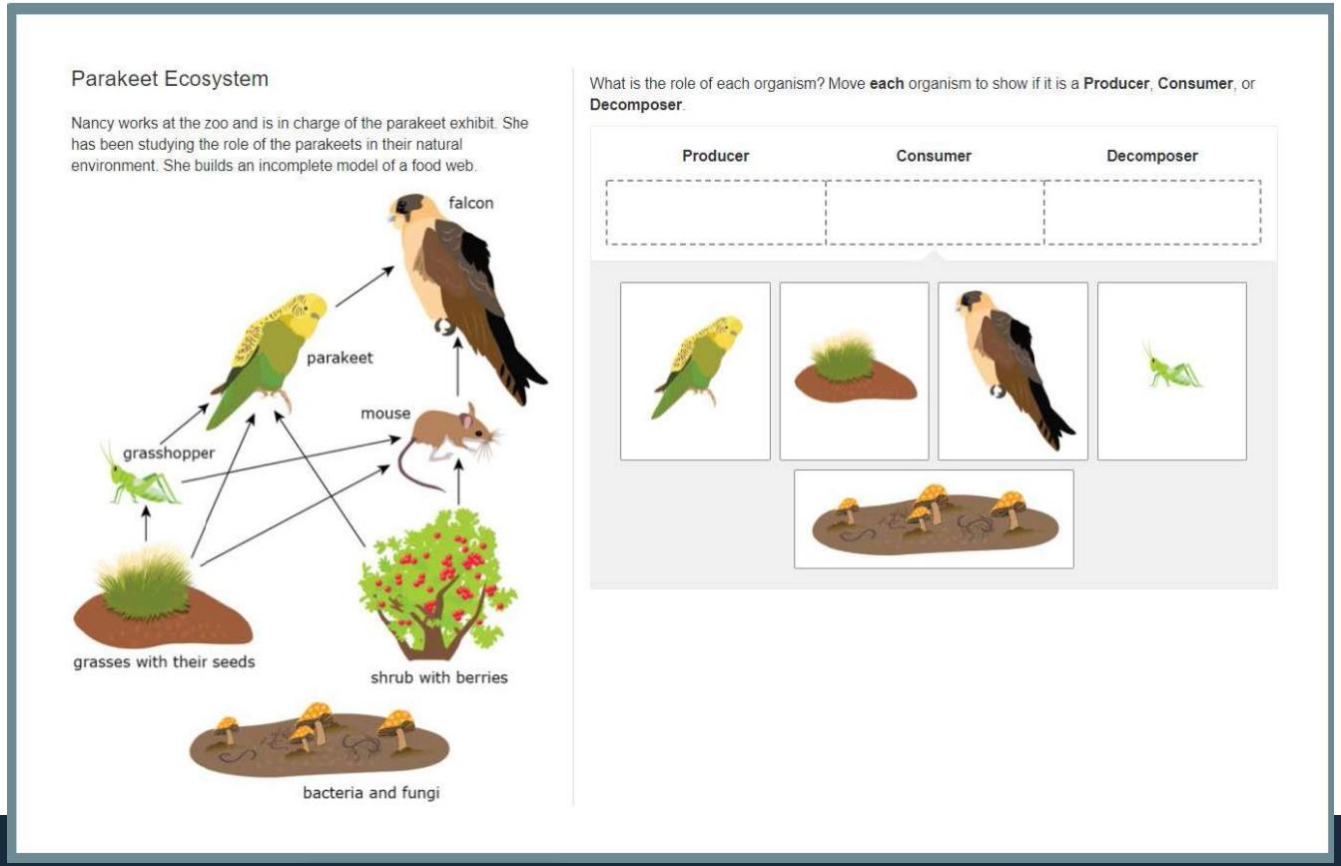
C The Moon is much larger than other objects visible from Earth.

D The Moon is closer to Earth than are other visible objects in the sky.

Multiple choice

Multiple select

Item Types: Technology Enhanced



Drag-and-drop

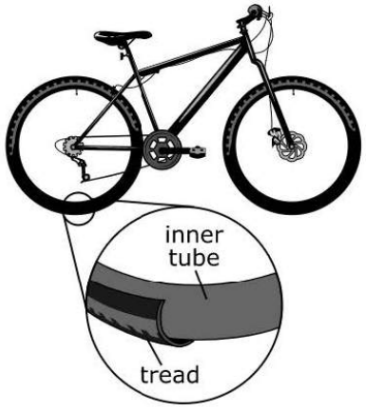
Hot spots

Inline choice

Item Types: Constructed Response

Popping Bike Tire

Leo lives in the desert, where outdoor temperatures can vary greatly from morning to night. Early one morning, Leo notices that his bicycle tire is flat, so he pumps air into both tires until they feel hard when he squeezes. He then goes for a ride although it is cold outside (-3.9°C) Later that afternoon, Leo takes another ride with his friend, Juan. The day is now much warmer (38°C). Part of the way through this ride, Leo hears a loud pop and sees that one of his tires has gone flat.



Why did the bicycle tire pop? Explain, based on the conditions both inside and outside the tire.

B I U

Students can earn 2, 1, or 0 points based on a rubric

Scored by human readers

ALL Items

Ask students to make sense of a phenomenon—observable occurrences in the natural or human-made world that cause one to wonder and ask questions—or scientific problem

Item Clusters

- Most items are grouped in a set or cluster
- Designed to provide scaffolding and sufficient information to measure multiple dimensions of the science standards without teaching the content
- Across each cluster, all three dimensions are addressed

See examples in 2022 Released Items for Grade 5

Standalone Items

- Brief scenario with one question
- Help ensure appropriate coverage of the Maine Learning Results (NGSS)

Achievement Levels

Four Achievement Levels

Achievement Level Descriptors

Standard Setting

Four Achievement Levels

Guideline to describe the four levels of achievement, which are levels of student mastery of the Maine Learning Results (NGSS)

Well Below State Expectations: The student's work demonstrates a minimal understanding of essential concepts in science. The student's responses demonstrate minimal ability to solve problems. Explanations are illogical, incomplete, or missing connections among central ideas. There are multiple inaccuracies.

Below State Expectations: The student's work demonstrates an incomplete understanding of essential concepts in science and inconsistent connections among central ideas. The student's responses demonstrate some ability to analyze and solve problems, but the quality of responses is inconsistent. Explanation of concepts may be incomplete or unclear.

At State Expectations: The student's work demonstrates an adequate understanding of essential concepts in science, including the ability to make connections among central ideas. The student's responses demonstrate the ability to analyze and solve routine problems and explain central concepts with sufficient clarity and accuracy to demonstrate general understanding.

Above State Expectations: The student's work demonstrates a thorough understanding of essential concepts in science, including the ability to make multiple connections among central ideas. The student's responses demonstrate the ability to synthesize information, analyze and solve difficult problems, and explain complex concepts using evidence and proper terminology to support and communicate logical conclusions.

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ASSESSMENT

Maine Science ALDs Explanatory Video

Achievement Level Descriptors

- Grade 5 ALDs
- Grade 8 ALDs
- High School ALDs

Standard Setting

- Cut scores for achievement levels established during standard setting
  - Summer 2022
  - Facilitated by New Meridian, the science assessment vendor
  - Monitored by psychometricians
  - Panelists were Maine educators
- Many different standard setting methods

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Ordered Item Booklet

Maine Science Assessment standard setting used the Ordered Item Booklet method

- After the assessment, items are listed in order of item difficulty (i.e., the probability of a student answering the question correctly)
- Educators create student profiles for students who perform at each achievement level

Ordered Item Booklet

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- After the assessment, items are listed in order of item difficulty (i.e., the probability of a student answering the question correctly)
- Educators create student profiles for students who perform at each achievement level
- Educators bookmark the location in the ordered item booklet where a student from that achievement level has a 67% chance of answering the question correctly

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Ordered Item Booklet

Maine Science Assessment standard setting used the Ordered Item Booklet method

- After the assessment, items are listed in order of item difficulty (i.e., the probability of a student answering the question correctly)
- Educators create student profiles for students who perform at each achievement level
- Educators bookmark the location in the ordered item booklet where a student from that achievement level has a 67% chance of answering the question correctly
- Discussions occur; educators have the option to change or maintain their bookmark following the discussion

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Reports & Reporting Elements

Appropriate Use and Limitations of Data

Individual Student Report

School Summary Report

SAU Summary Report

Student Score Data File (SSDF)

Appropriate Use and Limitations of Data

The Maine Science Assessment has several **appropriate uses**, including:

1. Providing information to the public about school performance through the state's ESSA reporting system, the ESSA Data Dashboard.

2. Supporting school identification within the state's ESSA compliant system of school identification and support.

3. Providing a source of information for ongoing local program evaluation.

Appropriate Use and Limitations of Data

However, there are also **limitations** to the data gathered from the Maine Science Assessment. These limitations are that:

1. The assessment measures only a subset of the Maine Learning Results and does not assess all aspects of science education.

2. The assessment is a snapshot of student performance at a particular point in time and may not reflect a student's overall understanding of science.

3. The assessment is only one measure of student performance and should be used in conjunction with other measures, such as classroom assessments and teacher observations.

It is important to use the data gathered from the Maine Science Assessment appropriately and to consider its limitations when making decisions about instructional support and improvement.

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Individual Student Report (ISR)

Individual Student Report (ISR)

Maine Department of Education

2024 Individual Student Report
Maine Science Assessment

Last, First MI.
Student ID
Student Grade
School Name
SAU Name

What is in this report?

This report provides a summary of the results of your student's performance on the state academic assessment, the Maine Science Assessment. The Maine Science Assessment is based on the Maine Science and Engineering Standards, i.e., the Next Generation Science Standards (NGSS). The Maine Science Assessment is required for Maine public school students in grades 5, 8, and the 3rd year of high school.

What is the Maine Science Assessment?

The Maine Science Assessment focuses on multidimensional learning that incorporates science and engineering practices and disciplinary core ideas. The NGSS describes science and engineering practices as those activities that scientists do to investigate the natural world. The disciplinary core ideas are the key content ideas in science and can be grouped into physical science, life science, and Earth and space science.

To create a more complete understanding of what your student knows and can do in relation to grade level standards, information from this report should be used alongside additional sources, such as school assessments and classroom learning.

Questions for the Student

- What are you studying in science class?
- What is your favorite part about science class?
- Can you think of any jobs that use science you would like to do when you grow up?

Questions for the Teacher

- What is my student learning in science class this year?
- How can I use this information to better support my student's learning?
- What resources are available in the community to support science learning?

Individual Student Report (ISR)

Maine Department of Education

2024 Individual Student Report
Maine Science Assessment

Last, First MI.
Student ID
Student Grade
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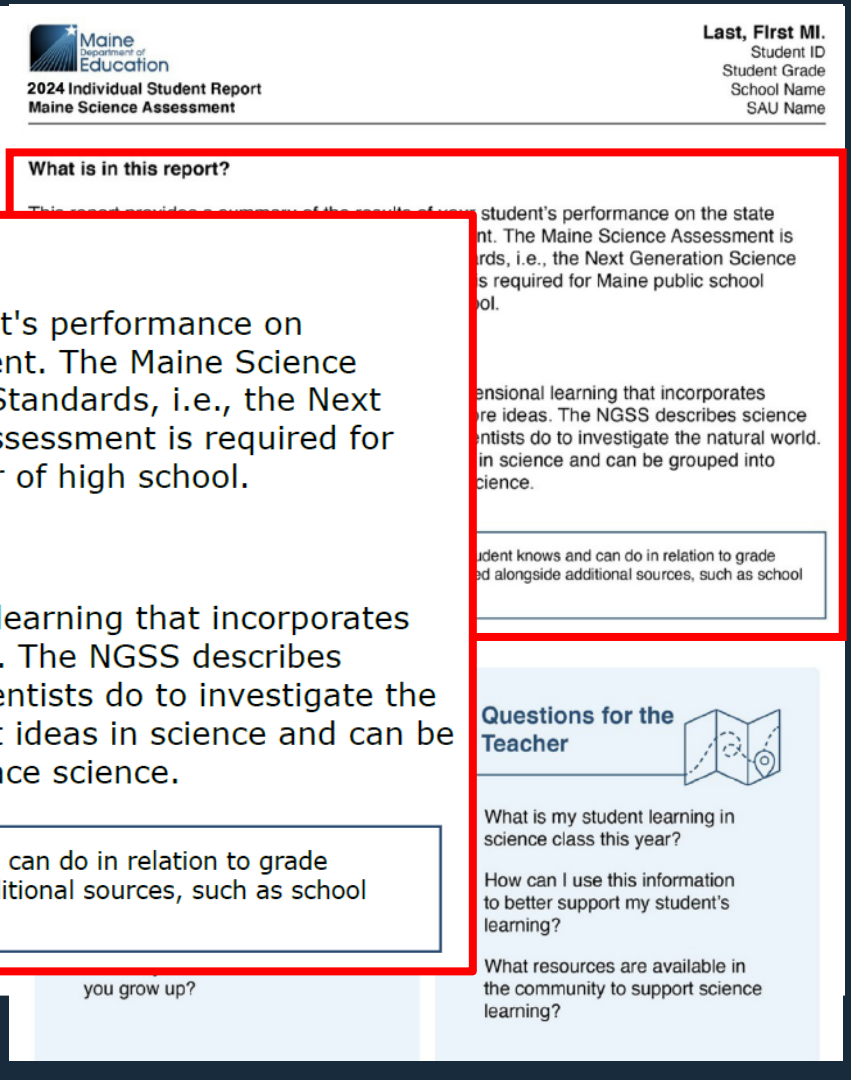
Individual Student Report (ISR)


Maine Department of Education
2024 Individual Student Report
Maine Science Assessment

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School Name
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What is the Maine Science Assessment?

The Maine Science Assessment focuses on multidimensional learning that incorporates science and engineering practices and disciplinary core ideas. The NGSS describes science and engineering practices as those activities that scientists do to investigate the natural world. The disciplinary core ideas are the key content ideas in science and can be grouped into physical science, life science, and Earth and space science.

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Maine Department of Education

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Maine Department of Education

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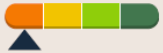

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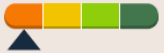
Matter and Energy in Organisms and Ecosystems



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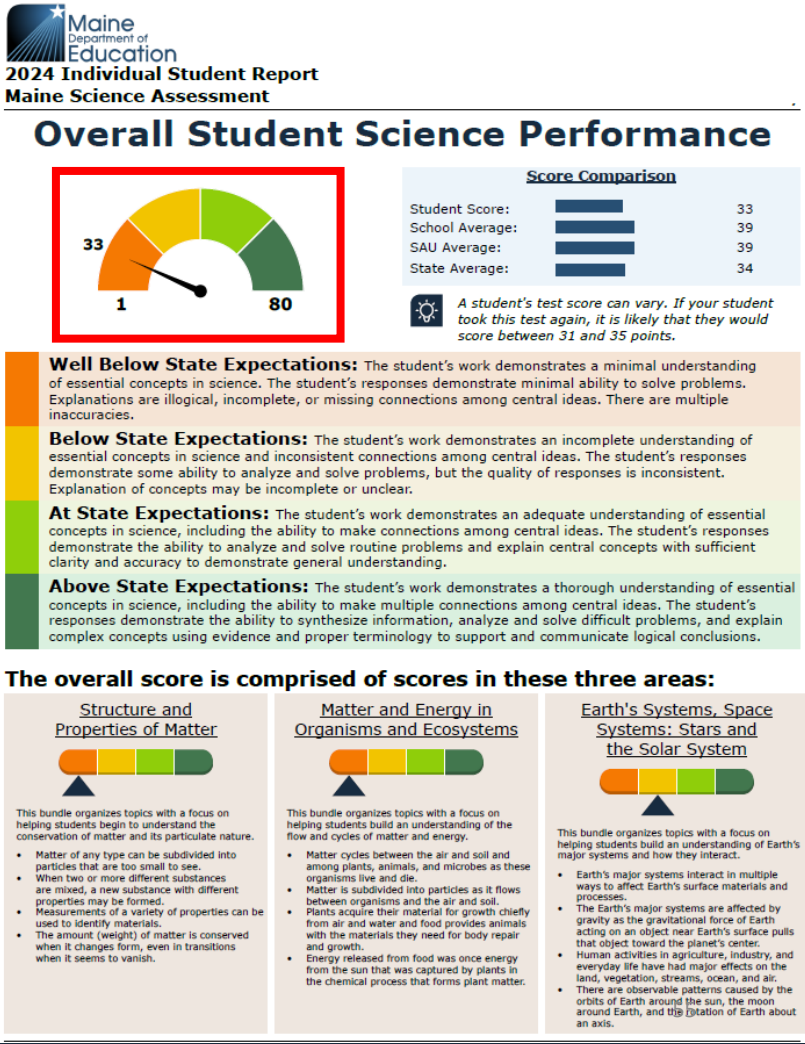
Individual Student Report (ISR)

Scale Score

A scaling process is used to convert raw scores into a common scale that can be used to compare student performance across different forms of the assessment and across different years.

- Reported as integers
- Used to determine a student's achievement level

Grade	Well Below State Expectations	Below State Expectations	At State Expectations	Above State Expectations
5	1–33	34–39	40–46	47–80
8	1–33	35–39	40–59	60–90
High School	1–34	35–39	40–49	50–90


Maine Department of Education

2024 Individual Student Report
Maine Science Assessment

Overall Student Science Performance

33
1
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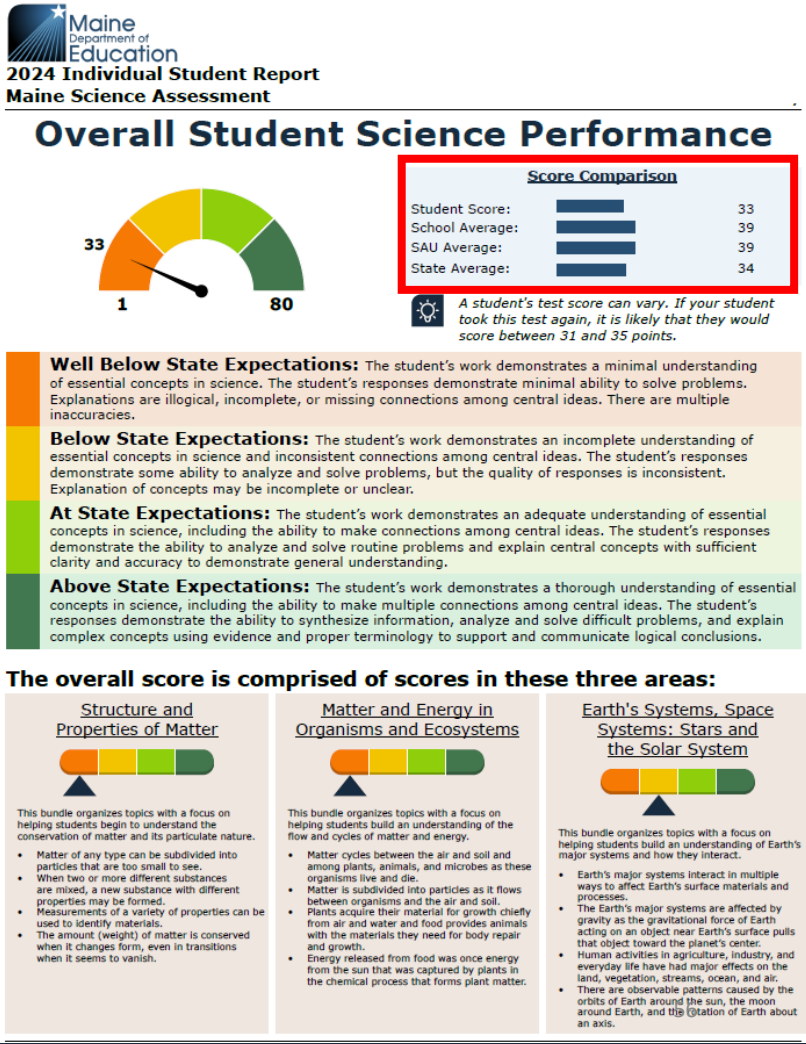
Individual Student Report (ISR)

Scale Score Comparisons

Uses average school, SAU, and state scores



Maine Department of Education

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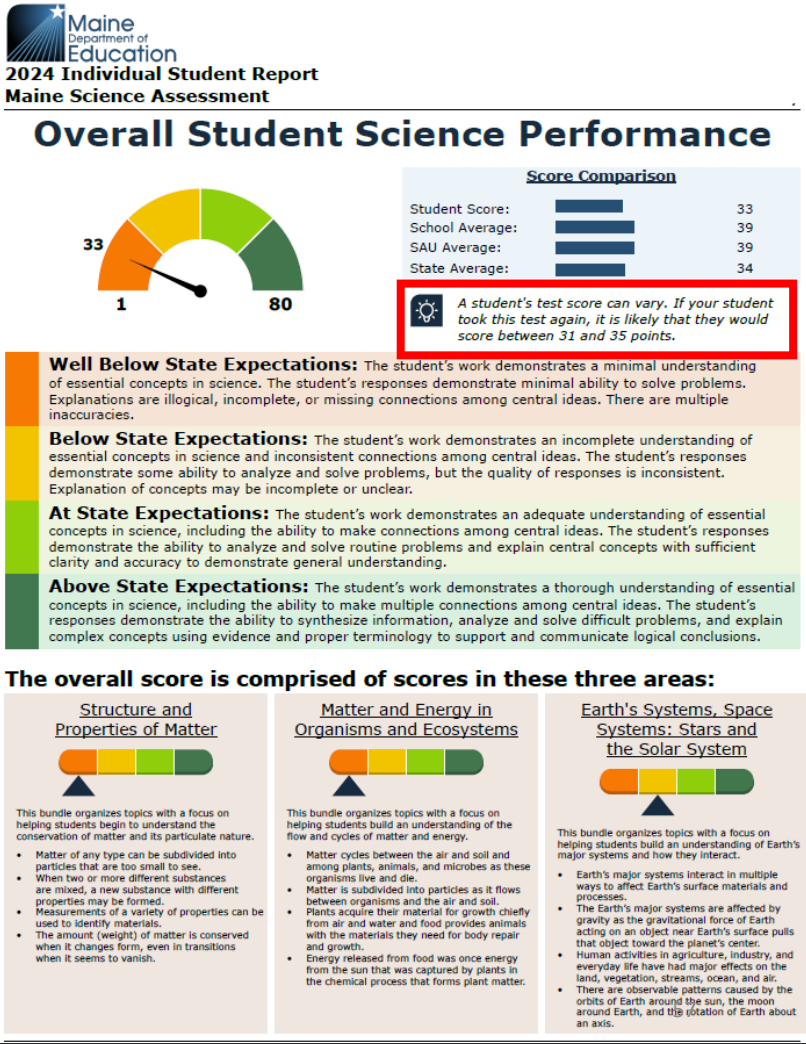
Individual Student Report (ISR)

Standard Error of Measurement (SEM)

- A statistical measure that quantifies the amount of error in a student's score on an assessment
- Estimates how much a student's score might differ if they took the assessment multiple times
- Provides information about the precision of assessment scores and helps determine the confidence that can be placed in a student's score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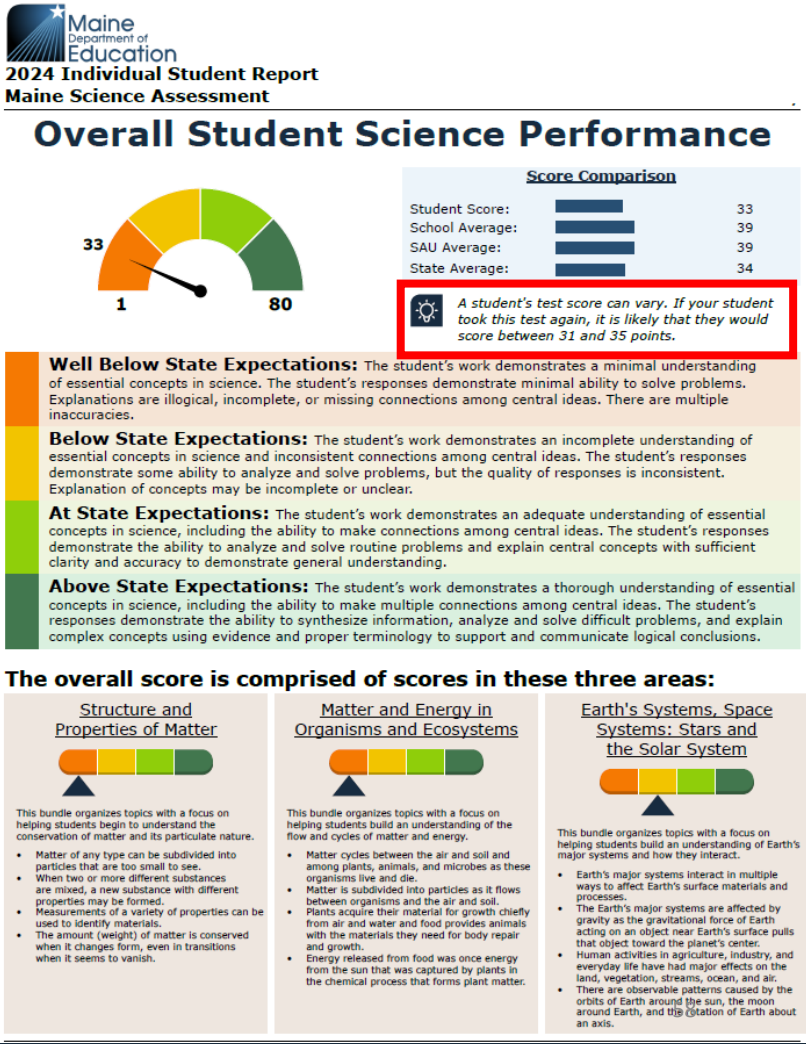
Individual Student Report (ISR)

SEM, continued

- Smaller SEM = a student's score is more precise and less likely to vary across repeated administrations
- Larger SEM = a student's score is less precise and more likely to vary across repeated administrations
- Used in calculating confidence intervals, which give a range within which a student's true score is likely to fall
- ISR uses 68% confidence interval, or ±1 SEM



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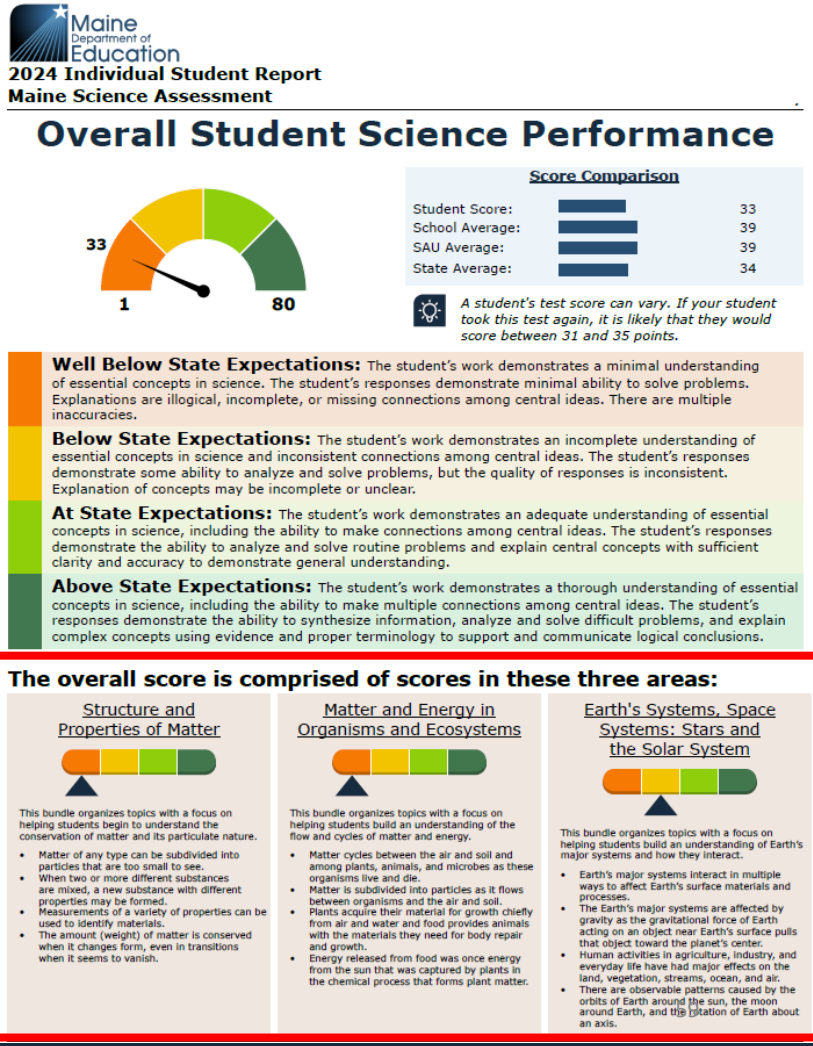
Individual Student Report (ISR)

Subscores

- Grade 5
  - Structure and Properties of Matter
  - Matter and Energy in Organisms and Ecosystems
  - Earth's Systems and Space Systems: Stars and the Solar System
- Grades 8 and High School
  - Physical Science
  - Life Science
  - Earth and Space Science



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Subscores: Grade 5

Structure and Properties of Matter (Subscore 1)

- Develop a model to describe that matter is made of particles too small to be seen.
- Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling or mixing substances, the total weight of matter is conserved.
- Make observations and measurements to identify materials based on their properties.
- Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Subscores: Grade 5

Matter and Energy in Organisms and Ecosystems (Subscore 2)

- Use models to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun.
- Support an argument that plants get the materials they need for growth chiefly from air and water.
- Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Subscores: Grade 5

Earth's Systems and Space Systems (Subscore 3)

- Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
- Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.
- Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
- Support an argument that the gravitational force exerted by Earth on objects is directed down.
- Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth.
- Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Maine Department of Education

Subscores: Grade 8

Physical Science (Subscore 1)

- Structure and Properties of Matter
- Chemical Reactions
- Forces and Interactions
- Energy
- Waves and Electromagnetic Radiation

Subscores: Grade 8

Life Science (Subscore 2)

- Structure, Function, and Information Processing
- Matter and Energy in Organisms and Ecosystems
- Interdependent Relationships in Ecosystems
- Growth, Development, and Reproduction of Organisms
- Natural Selection and Adaptation

Subscores: Grade 8

Earth and Space Science (Subscore 3)

- Space Systems
- History of Earth
- Earth’s Systems
- Weather and Climate
- Human Impacts

Subscores: High School

Physical Science (Subscore 1)

- Structure and Properties of Matter
- Chemical Reactions
- Forces and Interactions
- Energy
- Waves and Electromagnetic Radiation

Subscores: High School

Life Science (Subscore 2)

- Structure and Function
- Matter and Energy in Organisms and Ecosystems
- Interdependent Relationships in Ecosystems
- Inheritance and Variation in Traits
- Natural Selection and Evolution

67

Subscores: High School

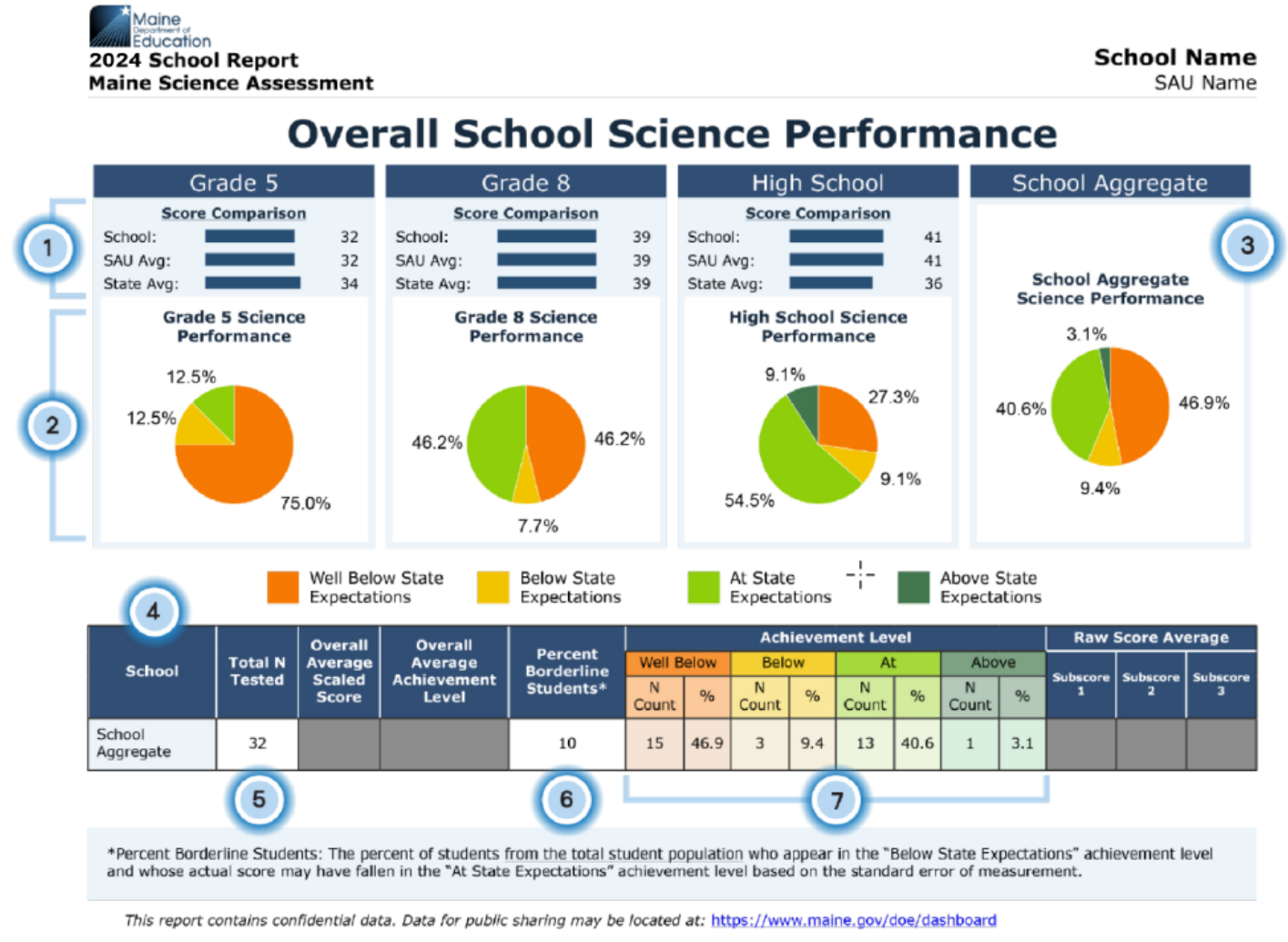
Earth and Space Science (Subscore 3)

- Space Systems
- History of Earth
- Earth’s Systems
- Weather and Climate
- Human Sustainability

School Summary Report

Report Elements

1. Score comparisons
2. Achievement level pie charts
3. Aggregate performance of all students in the school, inclusive of all grades
4. Table shows aggregate data for all students in the school, inclusive of all grades
5. Total number of students tested



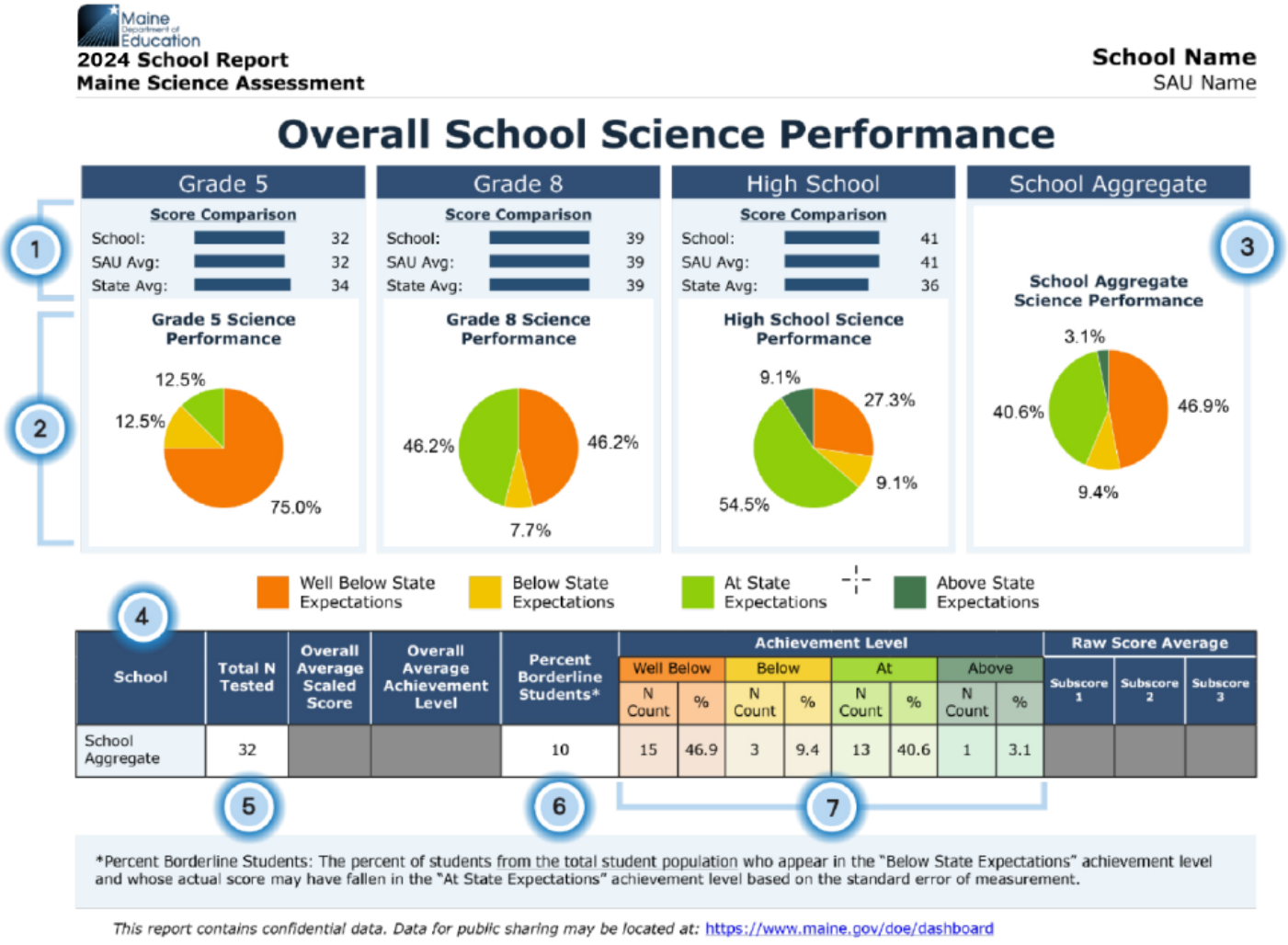
School	Total N Tested	Overall Average Scaled Score	Overall Average Achievement Level	Percent Borderline Students*	Achievement Level								Raw Score Average		
					Well Below		Below		At		Above		Subscore 1	Subscore 2	Subscore 3
					N Count	%	N Count	%	N Count	%	N Count	%			
School Aggregate	32			10	15	46.9	3	9.4	13	40.6	1	3.1			

Report Elements

6. Percent borderline students

Percent of students from total population who appear in "Below State Expectations" achievement level BUT SEM indicates that their actual score may have fallen in the "At State Expectations" level.

7. Student count and percentage at each achievement level



School	Total N Tested	Overall Average Scaled Score	Overall Average Achievement Level	Percent Borderline Students*	Achievement Level								Raw Score Average		
					Well Below		Below		At		Above		Subscore 1	Subscore 2	Subscore 3
					N Count	%	N Count	%	N Count	%	N Count	%			
School Aggregate	32			10	15	46.9	3	9.4	13	40.6	1	3.1			

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2024 School Report
Maine Science Assessment

School Name
SAU Name

Grade 5	Total N Tested	Overall Average Scaled Score	Overall Average Achievement Level	Percent Borderline Students*	Achievement Level								Raw Score Average		
					Well Below		Below		At		Above		Subscore 1	Subscore 2	Subscore 3
					N Count	%	N Count	%	N Count	%	N Count	%			
School Name	8	32	Well Below	13	6	75.0	1	12.5	1	12.5	0	0.0	5/12	7/17	5/16
State Grade 5	11945	34	Below	11	5869	49.1	3308	27.7	2318	19.4	450	3.8	6/12	7/17	7/16

1 2 3 4 5

Each data table on this page contains information for the school and state grade level indicated. These tables use the same format across all grade levels, so only one example data table is provided.

Report Elements

1. Information for the school at one grade level
2. Information for the state at one grade level
3. Average scaled score for the row
4. Percent borderline students, based on standard error of measurement (SEM)
5. Average subscores (*Reminder: Subscore areas are different for grade 5 than for grade 8 and high school.*)

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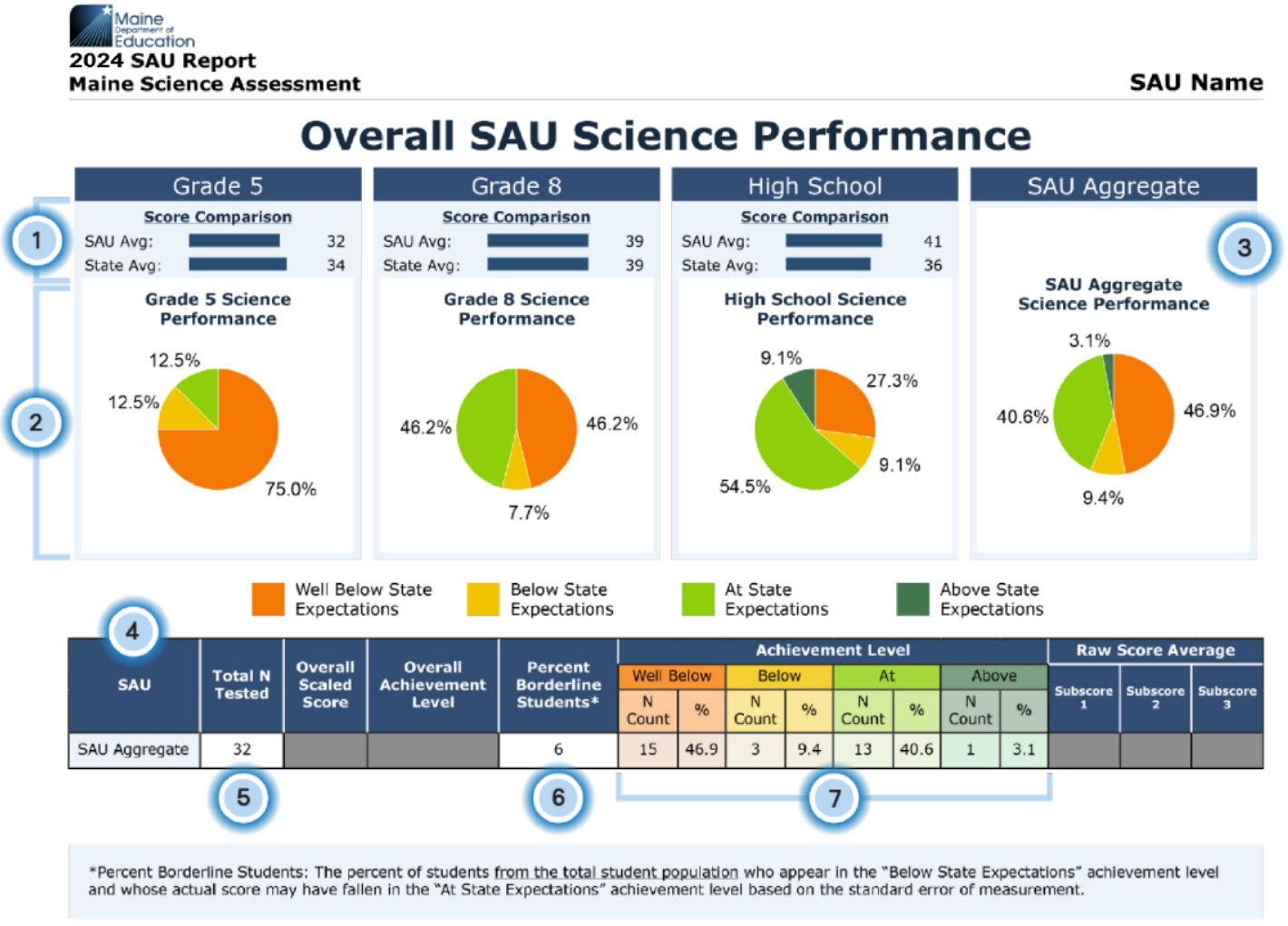
SAU Summary Report

Report Elements

1. Score comparisons
2. Achievement level pie charts
3. Aggregate performance of all students in the SAU, inclusive of all grades
4. Table shows aggregate data for all students in the SAU, inclusive of all grades
5. Total number of students tested

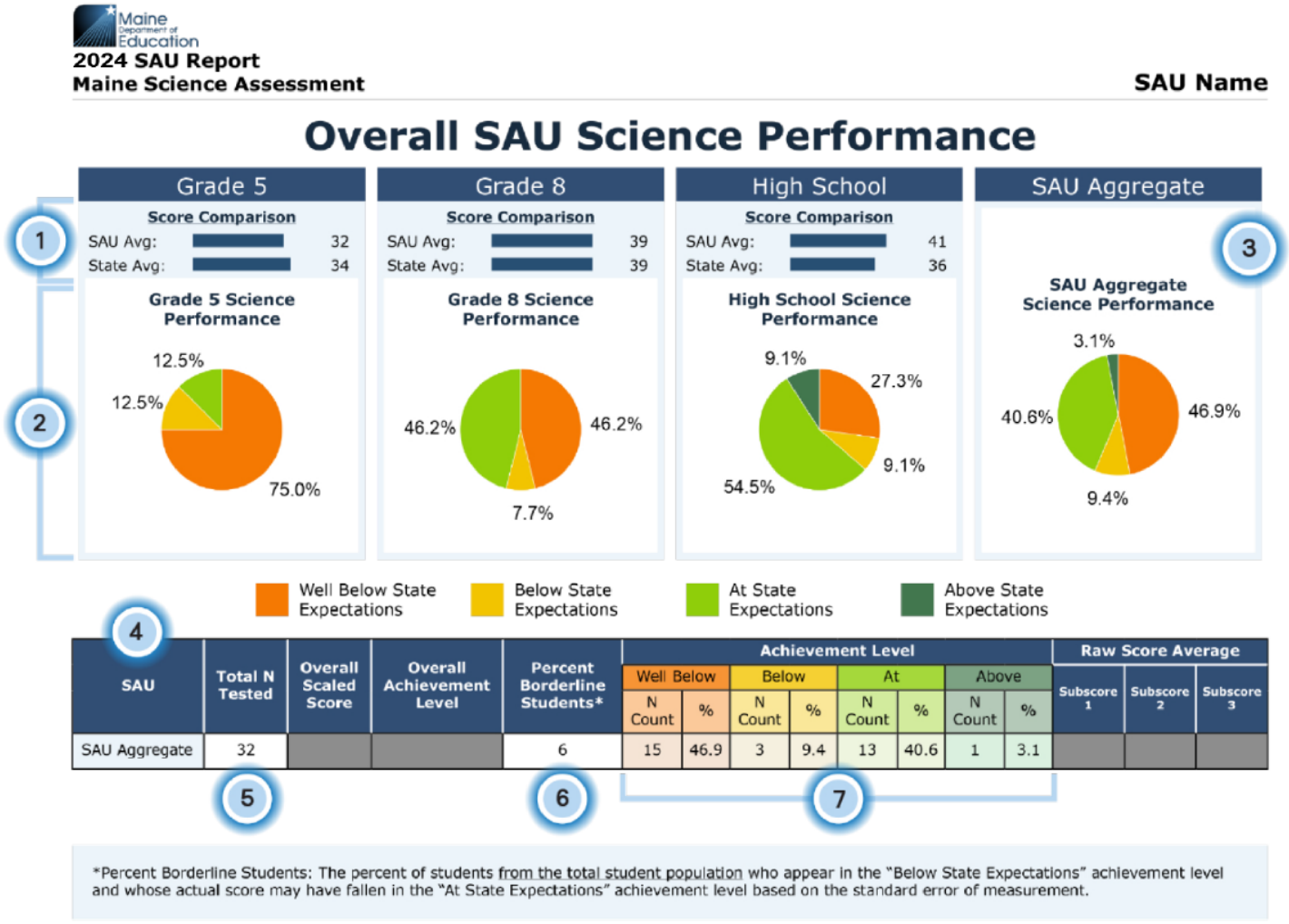


SAU	Total N Tested	Overall Scaled Score	Overall Achievement Level	Percent Borderline Students*	Achievement Level								Raw Score Average		
					Well Below		Below		At		Above		Subscore 1	Subscore 2	Subscore 3
					N Count	%	N Count	%	N Count	%	N Count	%			
SAU Aggregate	32			6	15	46.9	3	9.4	13	40.6	1	3.1			

*Percent Borderline Students: The percent of students from the total student population who appear in the "Below State Expectations" achievement level and whose actual score may have fallen in the "At State Expectations" achievement level based on the standard error of measurement.

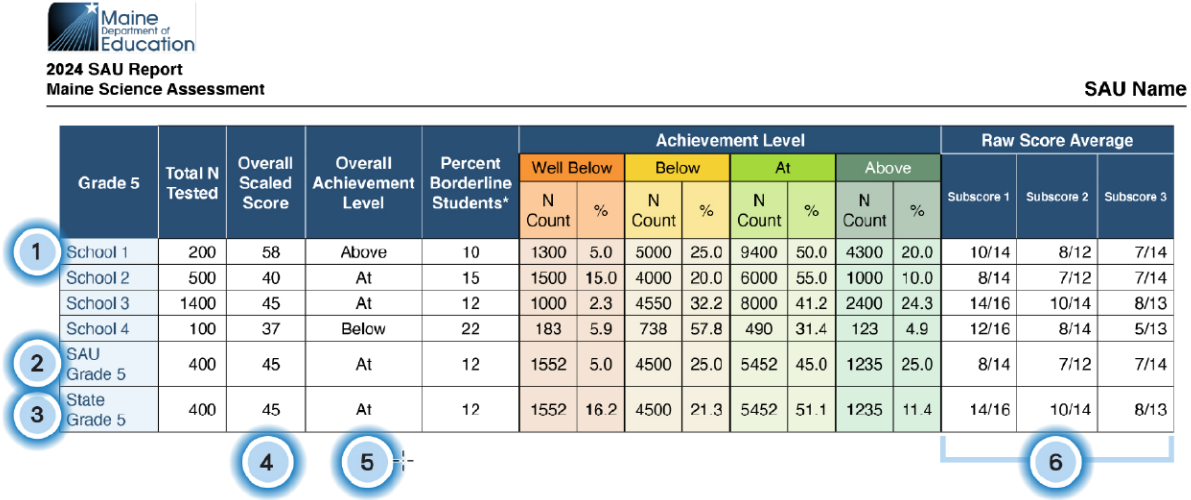
Report Elements

6. Percent borderline students
7. Student count and percentage at each achievement level



SAU	Total N Tested	Overall Scaled Score	Overall Achievement Level	Percent Borderline Students*	Achievement Level								Raw Score Average		
					Well Below		Below		At		Above		Subscore 1	Subscore 2	Subscore 3
					N Count	%	N Count	%	N Count	%	N Count	%			
SAU Aggregate	32			6	15	46.9	3	9.4	13	40.6	1	3.1			

*Percent Borderline Students: The percent of students from the total student population who appear in the "Below State Expectations" achievement level and whose actual score may have fallen in the "At State Expectations" achievement level based on the standard error of measurement.



Each data table on this page contains information for the school, SAU, and state grade level indicated. These tables use the same format across all grade levels, so only one example data table is provided.

Report Elements

1. Information for each school at one grade level
2. Information for the SAU at one grade level
3. Information for the state at one grade level
4. Average scaled score for the row
5. Average achievement level for the students at that grade level
6. Average subscores

Student Score Data File (SSDF)

Available in Data Extracts in Kite

Statewide Results

Statewide Data

- 35,973 students completed the assessment in spring 2024
  - 12,174 in Grade 5
  - 12,212 in Grade 8
  - 11,587 in High School
- **ALL** Grade Levels Aggregated
  - Well Below State Expectations: 43.9%
  - Below State Expectations: 22.0%
  - At State Expectations: 28.5%
  - Above State Expectations: 5.5%

Statewide Data: Grade 5

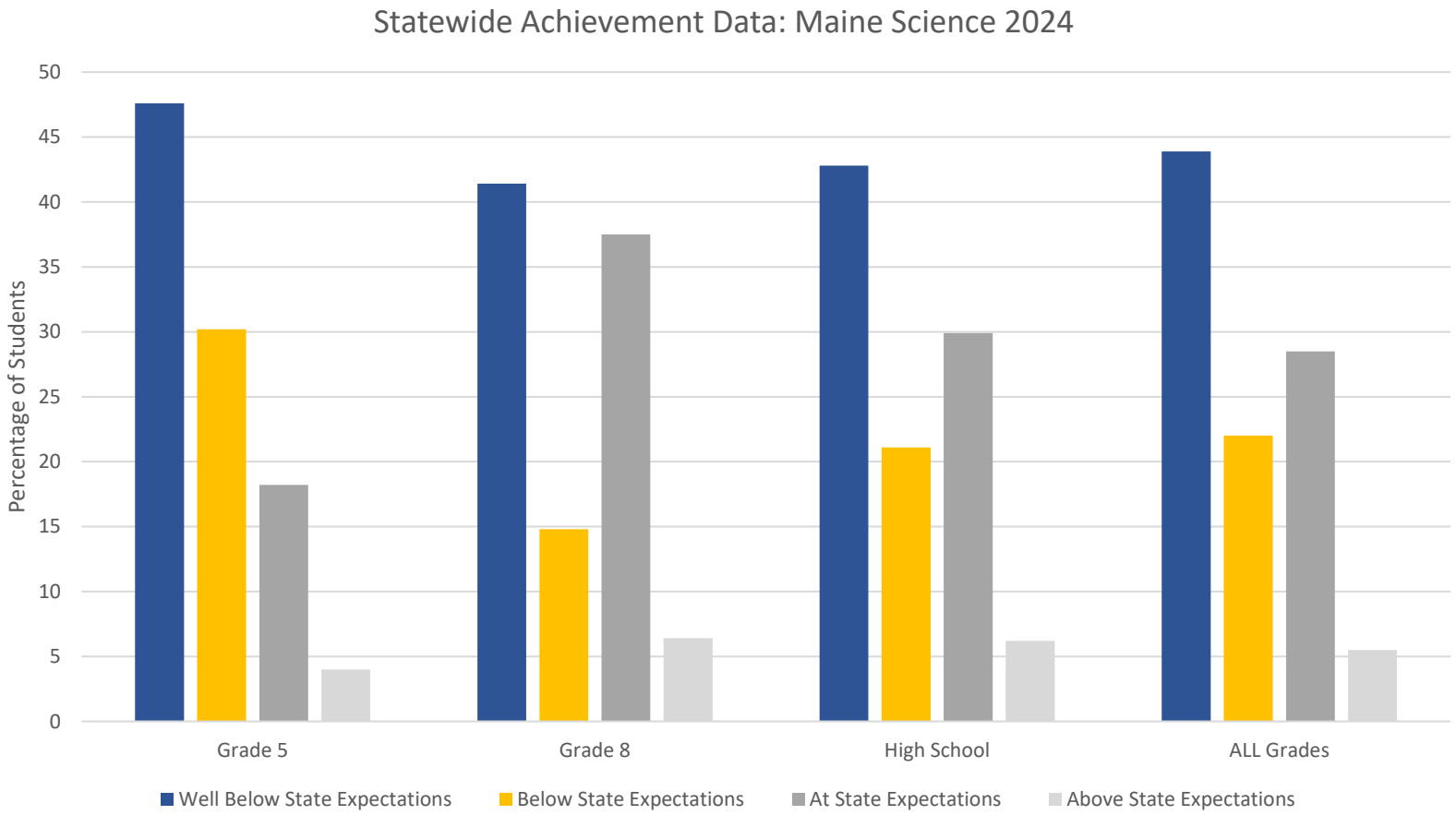
- **Achievement Level Percentages**
  - Well Below State Expectations: 47.6%
  - Below State Expectations: 30.2%
  - At State Expectations: 18.2%
  - Above State Expectations: 4.0%
- **Subscores**
  - Structure and Properties of Matter
    - Average Raw Score: 6/13
    - Percent At/Above State Expectations: 27.5%
  - Matter and Energy in Organisms and Ecosystems
    - Average Raw Score: 6/15
    - Percent At/Above State Expectations: 20.8%
  - Earth's Systems and Space Systems
    - Average Raw Score: 7/16
    - Percent At/Above State Expectations: 21.7%

Statewide Data: Grade 8

- **Achievement Level Percentages**
  - Well Below State Expectations: 41.4%
  - Below State Expectations: 14.8%
  - At State Expectations: 37.5%
  - Above State Expectations: 6.4%
- **Subscores**
  - Physical Science
    - Average Raw Score: 8/16
    - Percent At/Above State Expectations: 45.3%
  - Life Science
    - Average Raw Score: 6/16
    - Percent At/Above State Expectations: 43.6%
  - Earth and Space Science
    - Average Raw Score: 7/18
    - Percent At/Above State Expectations: 44.1%

Statewide Data: High School

- **Achievement Level Percentages**
  - Well Below State Expectations: 42.8%
  - Below State Expectations: 21.1%
  - At State Expectations: 29.9%
  - Above State Expectations: 6.2%
- **Subscores**
  - Physical Science
    - Average Raw Score: 7/18
    - Percent At/Above State Expectations: 31.5%
  - Life Science
    - Average Raw Score: 9/19
    - Percent At/Above State Expectations: 36.1%
  - Earth and Space Science
    - Average Raw Score: 8/18
    - Percent At/Above State Expectations: 34.0%


Statewide Achievement Data: Maine Science 2024
Percentage of Students
50
45
40
35
30
25
20
15
10
5
0
Grade 5
Grade 8
High School
ALL Grades
Well Below State Expectations
Below State Expectations
At State Expectations
Above State Expectations

Text-to-Speech (TTS)

Guidance for the Assignment of TTS

Designated Support: TTS

TTS is a designated support for the general assessments (Maine Science and Maine Through Year).

Criteria for assignment of TTS:

1. A team of two or more education professionals with knowledge of the student's performance have determined that TTS is an appropriate support for the student, and
2. TTS (or read aloud) is used routinely in classroom instruction and assessment.

Designated supports **do not require** that a student has an IEP, 504 plan, ILAP, RTI plan, or any other support plan.

TTS: Supplemental Guidance

Students should be able to navigate the assessment **independently with confidence**, to the greatest degree possible.

If educators perceive that a student would **struggle to decode two or more words from their grade-level list**, text-to-speech is an appropriate designated support for that student.

Grade 5

Science
1. Evaporate/evaporation
2. Quantity
3. Reflectivity/reflective
4. Conductivity/conductive
5. Electrical
6. Thermal
7. Solubility/soluble
8. Investigation
9. Gravity/gravitational
10. Ecosystem
11. Organism
12. Decomposer
13. Geosphere
14. Biosphere
15. Hydrosphere
16. Atmosphere
17. Percentage
18. Reservoir
19. Distribution
20. Glacier

Grade 8

Science
1. Collision
2. Gravitational
3. Attractive
4. Interpret
5. Relationship
6. Amplitude
7. Absorb/absorption
8. Digitized
9. Analog
10. Cyclic
11. Eclipse
12. Specialized
13. Reproduction
14. Diversity
15. Extinction
16. Anatomy/ anatomical
17. Evolution/ evolutionary
18. Embryo/ embryological
19. Genetic
20. Inheritance

High School

Science
1. Valence
2. Sodium
3. Chloride
4. Hydrogen
5. Equilibrium
6. Macroscopic
7. Thermodynamics
8. Resonance
9. Specialization/specialized
10. Homeostasis
11. Photosynthesis
12. Amino
13. Aerobic/anaerobic
14. Mitosis
15. Meiosis
16. Ancestry
17. Heritable
18. Astronomical
19. Continental
20. Oceanic

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Constructed Response Items

Statistics

Grade Level & Item	% Students Score 0	% Blank	% Students Score 1	% Students Score 2
Grade 5 CR Item A	32%	2%	52%	15%
Grade 5 CR Item B	32%	1%	50%	18%
Grade 8 CR Item A	71%	2%	26%	2%
Grade 8 CR Item B	70%	3%	26%	3%
Grade 8 CR Item C	47%	2%	38%	14%
HS CR Item	73%	4%	16%	9%

Comparing Assessment Models

A Tale of Three Assessments

MAINE SCIENCE ASSESSMENT

Q&A

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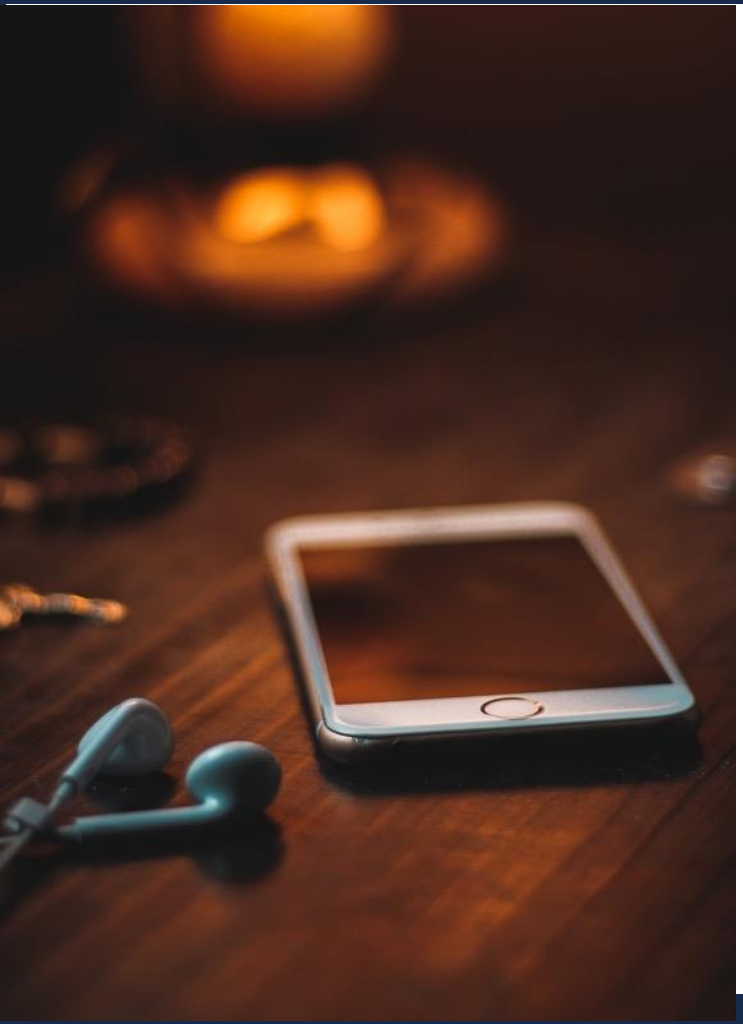

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