New York State
Testing Program

Educator Guide to the Regents Examination in Physical Science: Chemistry

New York State P-12 Learning Standards

June 2025

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Foreword

The information contained in this Educator Guide is designed to raise educator awareness of the structure of the New York State Regents Examination in Physical Science: Chemistry measuring the New York State P-12 Science Learning Standards (https://www.nysed.gov/sites/default/files/programs/standards-instruction/p-12-science-learning-standards.pdf).

The guide provides educators with pertinent information about the test development process, the learning standards that this test is designed to measure, the test specifications used to create this test, and the test design, which includes what types of questions will be asked. Links to additional resources are provided to further enhance educators' understanding of the structure of this test. Educators are encouraged to review the guide prior to the test administration to gain familiarity with the test format. The information presented can also be used as a platform for educator discussion on how student assessment results can guide future instruction.

The High School Regents Examination testing schedule for the June 2026 administration can be found on the New York State Education Department's website (https://www.nysed.gov/state-assessment/regents-examination-schedules). Questions regarding the New York State Testing Program and test design may be addressed to the Office of State Assessment at emscassessinfo@nysed.gov. Questions regarding the New York State Learning Standards may be addressed to the Office of Standards and Instruction at P12standardsinstruction@nysed.gov.

New York State Science Regents Examination Testing Program

Purpose of State Testing

The federal Every Student Succeeds Act (2015) requires students to be assessed at least once on science in high school. The New York State Regents Examination Testing Program has been designed to measure science knowledge and skills as defined by the New York State P-12 Science Learning Standards. The Science Regents Examinations are designed to report student proficiency in one of five performance levels. Please refer to page 8 of this guide for further information regarding the Performance Level Descriptions.

New York State Educators Involvement in Test Development

While teachers have always been included in the Regents Examination Development Process, the New York State Education Department (NYSED) continues to expand the number of opportunities for New York State educators to become involved. This includes writing all the test questions. New York State educators provide the critical input necessary to ensure that the tests are fair, valid, and appropriate for students through their participation in many test development activities. The test development process includes the development, review, and approval of test questions, construction of field and operational test forms, final approval of test forms prior to administration, the development of scoring materials, and the development of hands-on performance tasks. NYSED remains committed to improving the quality of the State's assessments and the experiences that students have taking these tests. For more information on opportunities for educators to participate in the test development process, please visit the Test Development Participation website (https://www.nysed.gov/state-assessment/test-development-participation-opportunities).

Required Investigations for the New York State Science Regents Examinations

The Investigations for Science Regents Examinations have been designed to be hands-on, three-dimensional learning tasks aligned to the New York State P-12 Science Learning Standards that can be embedded into curriculum. The Investigations are not a standardized State test; rather they are performance-based tasks that are a component of the State's strategy for assessing science. The Investigations will emphasize Performance Expectations (PEs) not measured at the level of proficiency on the written assessment, thereby ensuring these PEs are part of instruction. Approximately 15% of the questions on the written test will measure content related to the Performance Expectations measured by the Investigations. The questions encompassed in the ~15% will not be about the specific Investigation tasks themselves, but the content of the Performance Expectations (PEs) it is aligned to or related PEs. Other questions will assess scientific practices (SEPs), and common themes across science (i.e., Crosscutting Concepts) related to the activities undertaken by students in the Investigations, such as making and using scientific models and identifying patterns. Successful completion of the Investigations for the course will be required for admission to the Physical Science: Chemistry Regents Examination. The definition of successful completion is left to local discretion. Completion of the Investigations prepares students for the written test by providing a hands-on opportunity to demonstrate attainment of science knowledge and skills that also will be assessed on the written test. Scores on the Investigations will not be reported to the State or included in the students' final test scores. Additional information about the required Investigations is available in the Planning for Regents Examinations in Physical Science: Chemistry and Physical Science: Physics Investigations memo (https://www.nysed.gov/sites/default/files/programs/state-assessment/memo-planning-chemistry-physics-investigations.pdf) and the Investigations for the Regents Examinations in Physical Science: Chemistry and Physical Science: Physics Now Available memo (https://www.nysed.gov/sites/default/files/programs/state-assessment/investigations-regents-examinations-psc-psp-2025.pdf).

The New York State P-12 Science Learning Standards

The New York State P-12 Science Learning Standards (NYSP-12SLS) are a series of Performance Expectations (PEs) that define what students should know and be able to do as a result of their study of science. The New York State P-12 Science Learning Standards are based on the Framework for K–12 Science Education (the Framework) developed by the National Research Council and the Next Generation Science Standards. The Framework outlines three dimensions that are needed to provide students with a high-quality science education. The integration of these three dimensions provides students with a context for the content of science, how science knowledge is acquired and understood, and how the sciences are connected through concepts that have universal meaning across the disciplines. These content-rich standards will serve as a platform for advancing children's 21st-century science skills, which include abstract reasoning, collaboration skills, the ability to learn from peers and through technology, and flexibility as learners in a dynamic learning environment. The implementation of these standards will provoke dialogue and learning experiences that will allow complex topics and ideas to be explored from many angles and perspectives. Students are expected to learn how to think and how to solve problems for which there is no one solution while learning science skills along the way. The integration of the three dimensions is provided throughout the New York State P-12 Science Learning Standards (https://www.nysed.gov/sites/default/files/programs/standards-instruction/p-12-science-learning-standards.pdf) and are described below.

Dimension 1: Science and Engineering Practices (SEP)

The Science and Engineering Practices (SEPs) describe (a) the major practices that scientists employ as they investigate and build models and theories about the world, and (b) a key set of engineering practices that engineers use as they design and build systems. The term "practices" is used instead of a term such as "skills" to emphasize that engaging in scientific investigation requires not only skill but also knowledge that is specific to each practice.

The eight Science and Engineering Practices mirror the practices of professional scientists and engineers. The use of SEPs in the Performance Expectations is not only intended to strengthen students' skills in using these practices in the classroom, but also to develop students' understanding of the nature of science and engineering. Listed below are the eight Science and Engineering Practices from the Framework:

1. Asking questions and defining problems
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 and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Part of the intent in articulating these practices is to better specify what is meant by scientific inquiry and to identify the range of cognitive, social, and physical practices that it requires. As with all inquiry-based approaches to science teaching, the expectation is that students will engage in the practices themselves instead of merely learning about them secondhand. Students cannot fully comprehend scientific practices, nor fully appreciate the nature of scientific knowledge itself, without directly experiencing those practices for themselves.

Dimension 2: Disciplinary Core Ideas (DCI)

The continuing expansion of scientific knowledge makes it unrealistic to teach all the ideas related to a given discipline in exhaustive detail during the K-12 years. Given the vast amount of information available today, an important role of science education is to endow students with sufficient core knowledge so that they can acquire additional information on their own. By focusing on a limited set of ideas and practices in science and engineering, students will learn to evaluate and select reliable sources of scientific information, allowing them to continue their development well beyond their K-12 school years as science learners, users of scientific knowledge, and perhaps as producers of such knowledge.

The Disciplinary Core Ideas (DCIs) are built on the notion of learning as a developmental progression. They are designed to help children continually build on and revise their knowledge and abilities, starting from their curiosity about what they see around them and their initial conceptions about how the world works. The goal is to guide their knowledge toward a more scientifically-based and coherent view of the natural sciences and engineering, as well as of the ways they are pursued and their results used.

Dimension 3: Crosscutting Concepts (CCC)

The seven Crosscutting Concepts (CCCs) connect core ideas across disciplines and grade bands and give students an organizational structure to understand the world. They are not intended as additional content. Listed below are the Crosscutting Concepts from the Framework:

1. Patterns
2. Cause and Effect
3. Scale, Proportion, and Quantity
4. Systems and System Models
5. Energy and Matter in Systems
6. Structure and Function
7. Stability and Change of Systems

The Crosscutting Concepts have application across all domains of science. These Crosscutting Concepts are not unique to The Framework. They echo many of the unifying concepts and processes in the National Science Education Standards, the common themes in the Benchmarks for Science Literacy, and the unifying concepts in the Science College Board Standards for College Success. They also reflect discussions related to the NSTA Science Anchors project, which emphasizes the need to consider not only specific disciplinary content but also the ideas and practices that are applicable across all science disciplines.

Test Specifications

The Science Regents Examinations are rooted in a research-based approach to constructing assessments called Principled Assessment Design. This approach ensures that evidence gleaned from the assessment, as well as the interpretations of that evidence, align with and support the intended claims, purposes, and uses of the assessment. This method helps ensure that all aspects of the assessment are connected and that the results inform the initial questions/claims. Additionally, Principled Assessment Design allows for consistent development and administration of tests that are comparable and focus on conceptual and applied student understanding. This is achieved through the use of Assessment-based Claims and Assessment-based Evidence. Another essential step of Principled Assessment Design is provided through the Performance Level Descriptions (PLDs). PLDs provide a structure to build tasks that allow students to provide/produce evidence to exemplify knowledge and skills across the performance range.

Claims and Evidence

Assessment-based Claims are overarching statements that identify the key things a student should be able to do at the end of instruction, while Assessment-based Evidence are statements that identify what a student needs to do/say/produce in order to support the acquisition of a claim. Evidence will operationalize the claim by merging concepts and skills to help define the specific language choices within the claim. It is important to recognize that not all combinations of concept and skill will be appropriate given the time and format constraints of the test, the intended purpose, audience, and complexity (i.e., some PEs will not be able to be assessed at every level of proficiency).[1]

Physical Science: Chemistry Claims and Evidence

Claim # 1 (Structure and Properties of Matter):
A student can use and analyze data to develop and compare models and patterns to predict, investigate, communicate and support claims concerning the structure, function, transformations and interactions of matter and energy, at both the particulate-level and bulk scale.

Evidence: *A student demonstrates understanding of "Structure and Properties of Matter" through application, evaluation, analysis, and/or synthesis using science and engineering practices, core ideas, and crosscutting concepts related to:*

- Making predictions of the properties of elements based on the patterns found on the periodic table. [HS-PS1-1]
- Conducting an investigation to establish that the macroscopic properties of matter are caused by patterns in electrical forces between particles. [HS-PS1-3]
- Using evidence to develop a model that illustrates the changes in the energy and nucleus of an atom during a nuclear process. [HS-PS1-8]
- Communicating information using evidence as to how interactions at the particulate-level impact function on the bulk scale. [HS-PS2-6]
- Interpreting data to validate mathematical relationships between the combined gas law variables and the behavior of gases. [HS-PS1-9]
- Engaging in argument, using patterns of properties of solutions as evidence, to support claims regarding solution behavior. [HS-PS1-10]

[1]Although similar in name, the Next Generation Science Standards (NGSS) Evidence Statements do not serve the same function as the Claims and Evidence produced for Physical Science: Chemistry.

Claim #2 (Chemical Reactions):

A student can plan and conduct investigations, develop and revise models of chemical and physical systems based on patterns using scientific principles, qualitative and quantitative evidence to explain how changing conditions affect the interactions, conversions, and conservation of matter and energy in these systems.

Evidence: *A student demonstrates understanding of "Chemical Reactions" through application, evaluation, analysis, and/or synthesis using science and engineering practices, core ideas, and crosscutting concepts related to:*

- Explaining the outcome of a chemical reaction citing evidence based on the element's position and observable patterns from the periodic table. [HS-PS1-2]
- Developing and using a model that explains the flow of energy and matter in a chemical reaction system. [HS-PS1-4, HS-LS1-5]
- Explaining how varying conditions and interactions between colliding particles affect reaction rates. [HS-PS1-5]
- Modifying the conditions to increase product yield for a system at equilibrium. [HS-PS1-6]
- Using quantitative evidence to support the Law of Conservation of Matter at the macroscopic and atomic scale. [HS-PS1-7]
- Conducting an investigation to collect and analyze data to recognize patterns in the behavior of acids and bases. [HS-PS1-11]
- Analyzing chemical reactions to provide evidence and formulate an argument that a transfer of electrons is accompanied by an energy conversion. [HS-PS1-12]

Claim #3 (Energy):

A student can create, develop and use models to communicate the changes in energy using qualitative, mathematical or computational thinking to explain the interaction of matter that can be used to represent the transformation, flow and conservation of energy in a system.

Evidence: *A student demonstrates understanding of "Energy" through application, evaluation, analysis, and/or synthesis using science and engineering practices, core ideas, and crosscutting concepts related to:*

- Create and modify a computational model to analyze overall energy changes in chemical and physical systems. [HS-PS3-1, HS-PS1-4]
- Utilizing a system model to predict the behavior of charged particles and related changes in energy. [HS-PS3-1, HS-PS3-5]
- Developing and using a model to explain the behavior of objects through electric or magnetic fields. [HS-PS3-5]

Claim #4 (Waves and Electromagnetic Radiation): A student can use published information to evaluate claims pertaining to the effects of the interactions of electromagnetic radiation with matter.
Evidence: *A student demonstrates understanding of "Waves and Electromagnetic Radiation" through application, evaluation, analysis, and/or synthesis using science and engineering practices, core ideas, and crosscutting concepts related to:* • Evaluating data used to predict the effects of varying frequencies of electromagnetic radiation when it is absorbed by matter. [HS-PS4-4] • Arguing from evidence that a published claim about effects of absorption of electromagnetic radiation by matter is valid and reliable. [HS-PS4-4]
Claim #5 (Engineering Design): A student can analyze models, including mathematical and computer simulations, that present criteria, trade-offs, and a range of constraints to design and evaluate a solution that optimizes technological and engineering practices for the management of systems, societal needs, environmental impacts, and real-world problems.
Evidence: *A student demonstrates understanding of "Engineering Design" through application, evaluation, analysis, and/or synthesis using science and engineering practices, core ideas, and crosscutting concepts related to:* • Students collected data, models, and simulations that identify, describe, and solve real-world problems designed to balance societal needs with societal wants while attempting to reduce impacts. [HS-ETS1-2, HS-ETS1-4] • Solutions to global challenges that meet criteria, require trade-offs, and are limited by constraints as illustrated by various types of models (computer, simulations, engineering). (HS-ETS 1-1, HS-ETS1-3)

Performance Level Definitions

For each subject area, students perform along a continuum of the knowledge and skills necessary to meet the demands of the Learning Standards for Science. There are students who meet the expectations of the standards with distinction, students who fully meet the expectations, students who minimally meet the expectations, students who partially meet the expectations, and students who do not demonstrate sufficient knowledge or skills required for any performance level. New York State assessments are designed to classify student performance into one of five levels based on the knowledge and skills the student has demonstrated.

These performance levels for the Science Regents Examinations are defined as:

NYS Level 5
Students performing at this level meet the expectations of the Science Learning Standards **with distinction** for Physical Science: Chemistry.

NYS Level 4
Students performing at this level **fully meet** the expectations of the Science Learning Standards for Physical Science: Chemistry. They are likely prepared to succeed in the next level of coursework.

NYS Level 3
Students performing at this level **minimally meet** the expectations of the Science Learning Standards for Physical Science: Chemistry. They meet the content area requirements for a Regents diploma but may need additional support to succeed in the next level of coursework.

NYS Level 2
Students performing at this level **partially meet** the expectations of the Science Learning Standards for Physical Science: Chemistry. Students with disabilities performing at this level meet the content area requirements for a local diploma but may need additional support to succeed in the next level of coursework.

NYS Level 1
Students performing at this level demonstrate knowledge, skills, and practices embodied by the Science Learning Standards for Physical Science: Chemistry below that of Level 2.

Performance Level Descriptions

Performance Level Descriptions exemplify the knowledge and skills students at each performance level demonstrate and describe the progression of learning within a subject area. The Performance Level Descriptions play a central role in the test development process, specifically question writing and standard setting. For information about the New York State P-12 Science Learning Standards Performance Level Descriptions for Physical Science: Chemistry, please see the Physical Science: Chemistry Performance Level Descriptions (https://www.nysed.gov/sites/default/files/programs/state-assessment/physical-science-chemistry-plds.pdf).

Test Blueprint

The table below illustrates the test blueprint percent ranges for each topic in Physical Science: Chemistry. All questions on the 2026 Physical Science: Chemistry exam measure the New York State P-12 Science Learning Standards. All the Performance Expectations (PEs) within the learning standards are connected to the Scientific and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscutting Concepts (CCCs).) Therefore, every question on the Physical Science: Chemistry exam will draw from all three dimensions (SEPs, DCIs, CCCs) in requiring students to demonstrate their knowledge and skills.

Topic-level Operational Test Blueprint—Percent Ranges for Physical Science: Chemistry					
Structures and Properties of Matter	**Chemical Reactions**	**Energy**	**Waves and Electromagnetic Radiation**	**Matter and Energy in Organisms and Ecosystems**	**Engineering, Technology, and the Applications of Science[2]**
30-40%	**36-46%**	**10-14%**	**5-7%**	**2-5%**	**5-11%**

Test Organization – Question Clusters

All questions on the Science Regents Examinations are organized into clusters of questions that follow an assessment storyline. An assessment storyline provides a coherent path toward building Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts attached to a phenomenon. In question clusters, each question that is answered may add to the developing explanation, model, or design solution. The group of questions in a cluster follow a theme or storyline grounded in a phenomenon that is focused on an anchor Performance Expectation. However, questions that address other related Performance Expectations can also be included in the cluster.

Question clusters include an introduction (which informs students of how many questions are a part of the cluster), multiple stimuli (reading passages, data tables, graphs, diagrams, photos, etc.), and questions that draw on one or more of the stimuli. The questions within the cluster will include multiple-choice and constructed-response questions. There will be variation in the number of questions that make up each cluster depending upon the assessment storyline; as a result, there may be slight variation in the total number of exam questions (see Test Design below).

To preview several question clusters, go to the [Physical Science: Chemistry Question Sampler](https://www.nysed.gov/state-assessment/physical-science-chemistry) (https://www.nysed.gov/state-assessment/physical-science-chemistry).

[2] In addition to questions directly aligned to the Engineering, Technology, and the Applications of Science (ETS) domain, ETS skills and concepts can also be assessed through questions aligned to Physical Science: Chemistry.

Stimuli

Each cluster will include multiple stimuli that are associated with several questions. Stimuli can include reading passages, data tables, graphs, diagrams, and photos. These stimuli provide students with an interesting and relatable setting that drives the progression of the assessment storyline. Stimuli are scientifically accurate and use real data when applicable. These come from vetted sources and are appropriate to the level being tested.

Question Formats

The Physical Science: Chemistry Test contains 1-credit multiple-choice questions and 1-credit constructed-response questions. For multiple-choice questions, students select the response that best completes the statement or answers the question from four answer choices. For the constructed-response questions, students record their answer or answers to an open-ended question.

Test Design

The chart below illustrates the test design for the 2026 Physical Science: Chemistry Test. Approximately 60 percent of each test will be comprised of multiple-choice questions, while approximately 40 percent will be constructed-response questions. There will be variation in the number of questions that make up each cluster, and as a result the total number of questions for each test will vary (see Test Organization - Question Clusters above).

Physical Science: Chemistry Test Design

Number of Question Clusters	Total Number of Questions
9-11	45-55

Testing Sessions

The Regents Examination in Physical Science: Chemistry will be administered during the designated time determined by NYSED. Students are permitted three hours to complete the Regents Examination in Physical Science: Chemistry. The tests must be administered under standard conditions and the directions must be followed carefully. The same test administration procedures must be used with all students so that valid inferences can be drawn from the test results.

NYSED devotes great attention to the security and integrity of the New York State Testing Program. School administrators and teachers involved in the administration of State assessments are responsible for understanding and adhering to the instructions set forth in the School Administrator's Manual and Teacher's Directions when released. For more detailed information about test administration, including proper procedures for proctoring, please refer to the *School Administrator's Manual* and the *Teacher's Directions.*

Scoring Policies for the Physical Science: Chemistry Test

The general procedures to be followed in scoring Regents Examinations are provided in the publications Directions for Administering Regents Examinations (DET 541) and the School Administrator's Manual. Both of these documents will be available on the Department's website prior to the administration of the exam. For more information, see the Information Booklet for Scoring the Regents Examinations for Sciences, the Directions for Administering Regents Examinations, the Scoring Key and Rating Guides for the appropriate examination.

Physical Science: Chemistry Reference Tables and Materials

The Physical Science: Chemistry test requires the use of a reference table that is provided on the Department's website. It contains information that students are expected to be able to locate and apply, but not necessarily memorize. Teachers should use the reference table in instruction throughout the Physical Science: Chemistry course to familiarize students with its content. The Department does not provide printed copies of the reference tables. Schools are required to use the online versions to print sufficient copies to supply one clean copy to each student during the administration of the examination. A Braille version of the References Tables for Physical Science: Chemistry will be available through NYSED by placing a request for needed copies via EXAMREQUEST@nysed.gov .

Each student must be provided with a scientific calculator for their exclusive use during the entire examination. Students are permitted to use graphing calculators when taking this examination. The memory of any graphing calculator with programming capability must be cleared, reset, or disabled when students enter the testing room. If the memory of a student's calculator is password-protected and cannot be cleared, the calculator must not be used. No students may use calculators that are capable of symbol manipulation or that can communicate with other calculators through infrared sensors, nor may students use operating manuals, instruction or formula cards, or other information concerning the operation of calculators during the test. For more information regarding calculators see The Guidelines for Graphing Calculator Use and the Directions for Administering Regents Examinations.