NYS P-12 Science
LEARNING STANDARDS

New York State P-12 Science Learning Standards Quick Guide

What are the New York State P-12 Science Learning Standards (NYSP12SLS)?

Adapted from the Next Generation Science Standards in 2016, the NYSP12SLS are a series of performance expectations that define what students should understand and be able to do because of their study of science. The NYSP12SLS are based on the Framework for K–12 Science Education developed by the National Research Council and the Next Generation Science Standards as well as guiding documents grounded in the most current research in science and scientific learning. These standards reflect the importance of every student's engagement with natural scientific phenomenon at the nexus of three dimensions of learning: Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts.

What are the three dimensions of the New York State P-12 Science Learning Standards?

*Below is a quick introduction to the **Science and Engineering Practices**, **Disciplinary Core Ideas**, and **Crosscutting Concepts**. For more information, please visit the Introduction to the New York State P-12 Science Learning Standards at http://www.nysed.gov/common/nysed/files/programs/curriculum-instruction/nysscienceintro.pdf.*

Science and Engineering Practices

⇒ Science and Engineering Practices describes (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.

⇒ 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

Disciplinary Core Ideas

⇒ Disciplinary Core Ideas 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 in which they are pursued and their results can be used.

Crosscutting Concepts

⇒ Crosscutting Concepts are meant to give students an organizational structure to understand the world and help students make sense of and connect Core Ideas across disciplines and grade bands.

⇒ Listed below are the seven 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

Q&A for Science Educators

Q: When will the New York State P-12 Science Learning Standards (NYSP12SLS) and their corresponding state assessments be implemented? *The implementation timeline can be found at found on the NYSED Science Curriculum and Instruction website. Visit http://www.nysed.gov/common/nysed/files/programs/curriculum-instruction/science-timeline.pdf*

Q: Are there High School Course maps in Science? *Yes, there are NYSP12SLS aligned High School course maps for Biology, Earth and Space Sciences, Chemistry, and Physics. Visit http://www.nysed.gov/curriculum-instruction/science-high-school-course-maps to access the High School Course maps in Science.*

Q: Where can I learn more about NYSP12SLS? *You can learn more about the NYS P-12 Science Learning Standards by visiting the NYSED web site. Visit http://www.nysed.gov/curriculum-instruction/science-learning-standards*

NYS P-12 Science LEARNING STANDARDS

The Domains of NYSP12SLS

LS: Life Science **ESS: Earth and Space Sciences** **PS: Physical Science**

ETS: Engineering, Technology, and the Application of Science

NOTE: NYSED has divided the PS domain into Chemistry and Physics as seen in the NYSED High School Science Course maps.

Below is an example of the organization of the New York State P-12 Science Learning Standards.
Please visit the Introduction to the New York State P-12 Science Learning Standards document for more information.

Title

Indicates grade level or grade band and Topic Area.

Performance Expectations

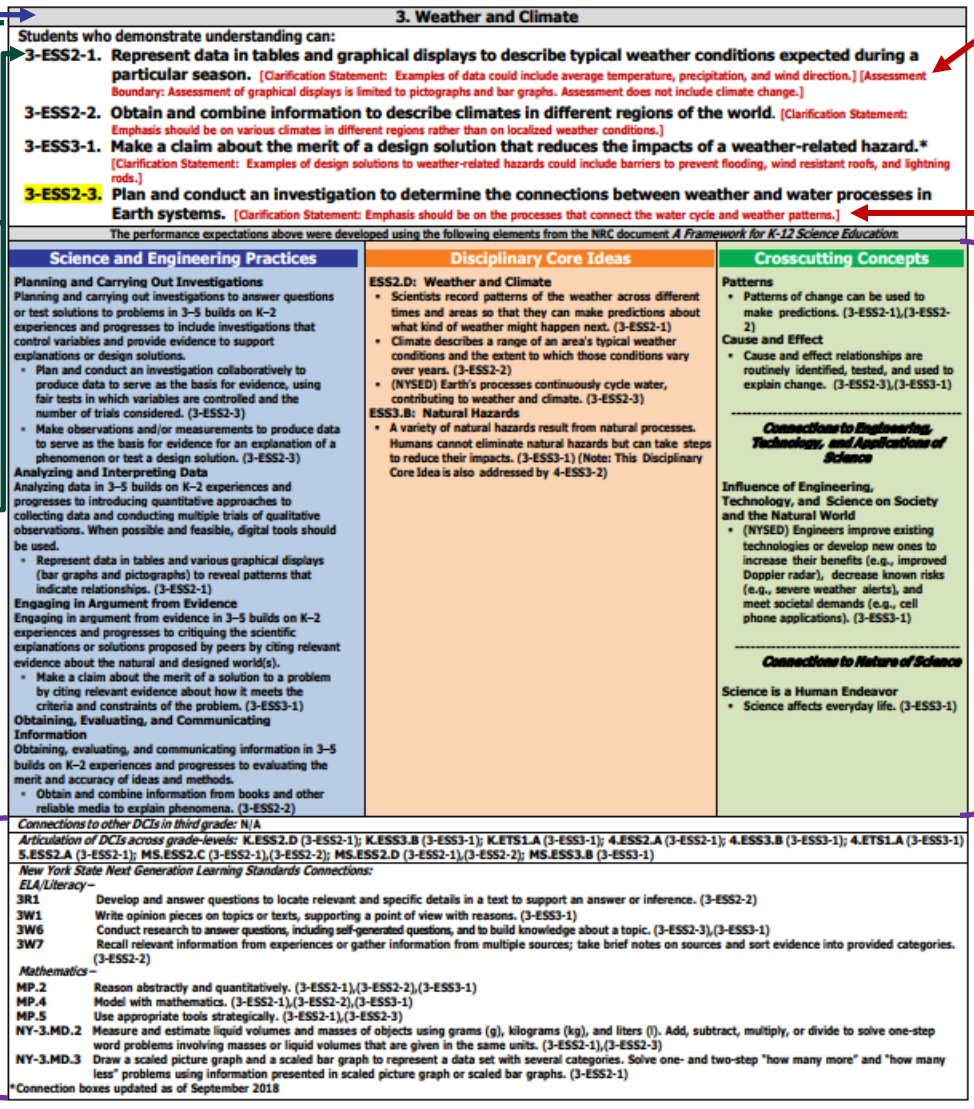
Includes each performance expectation for that grade level/Topic Area and Clarification Statement and/or Assessment Boundary, as appropriate.

Performance Expectation Code

References the aligned expectation in the 3 dimensions.

Connection Boxes

Include connections to other Disciplinary Core Ideas within the same grade level, articulations of Disciplinary Core Ideas across grade levels, and connections to State Standards in Mathematics and English Language Arts and Literacy.



New York State P-12 Science Learning Standards

3. Weather and Climate

Students who demonstrate understanding can:

3-ESS2-1. **Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.** [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]

3-ESS2-2. **Obtain and combine information to describe climates in different regions of the world.** [Clarification Statement: Emphasis should be on various climates in different regions rather than on localized weather conditions.]

3-ESS3-1. **Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.*** [Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]

3-ESS2-3. **Plan and conduct an investigation to determine the connections between weather and water processes in Earth systems.** [Clarification Statement: Emphasis should be on the processes that connect the water cycle and weather patterns.]

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

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-ESS2-3)
- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-ESS2-3)

Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
- Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1)

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).
- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-ESS3-1)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.
- Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2)

Disciplinary Core Ideas

ESS2.D: Weather and Climate
- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)
- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)
- (NYSED) Earth's processes continuously cycle water, contributing to weather and climate. (3-ESS2-3)

ESS3.B: Natural Hazards
- A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1) (Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2)

Crosscutting Concepts

Patterns
- Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2)

Cause and Effect
- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS2-3),(3-ESS3-1)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World
- (NYSED) Engineers improve existing technologies or develop new ones to increase their benefits (e.g., improved Doppler radar), decrease known risks (e.g., severe weather alerts), and meet societal demands (e.g., cell phone applications). (3-ESS3-1)

Connections to Nature of Science

Science is a Human Endeavor
- Science affects everyday life. (3-ESS3-1)

Connections to other DCIs in third grade: N/A

Articulation of DCIs across grade-levels: **K.ESS2.D** (3-ESS2-1); **K.ESS3.B** (3-ESS3-1); **K.ETS1.A** (3-ESS3-1); **4.ESS2.A** (3-ESS2-1); **4.ESS3.B** (3-ESS3-1); **4.ETS1.A** (3-ESS3-1); **5.ESS2.A** (3-ESS2-1); **MS.ESS2.C** (3-ESS2-1),(3-ESS2-2); **MS.ESS2.D** (3-ESS2-1),(3-ESS2-2); **MS.ESS3.B** (3-ESS3-1)

New York State Next Generation Learning Standards Connections:

ELA/Literacy –

3R1	Develop and answer questions to locate relevant and specific details in a text to support an answer or inference. (3-ESS2-2)
3W1	Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-ESS3-1)
3W6	Conduct research to answer questions, including self-generated questions, and to build knowledge about a topic. (3-ESS2-3),(3-ESS3-1)
3W7	Recall relevant information from experiences or gather information from multiple sources; take brief notes on sources and sort evidence into provided categories. (3-ESS2-2)

Mathematics –

MP.2	Reason abstractly and quantitatively. (3-ESS2-1),(3-ESS2-2),(3-ESS3-1)
MP.4	Model with mathematics. (3-ESS2-1),(3-ESS2-2),(3-ESS3-1)
MP.5	Use appropriate tools strategically. (3-ESS2-1),(3-ESS2-3)
NY-3.MD.2	Measure and estimate liquid volumes and masses of objects using grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or liquid volumes that are given in the same units. (3-ESS2-1),(3-ESS2-3)
NY-3.MD.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled picture graph or scaled bar graphs. (3-ESS2-1)

*Connection boxes updated as of September 2018

Assessment Boundary

Clarifies limitations to large-scale assessments.

Clarification Statement

Provides additional clarification for the performance expectation.

Foundation Boxes

Include pertinent Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts to further define the performance expectations. Codes in parentheses designate which of the performance expectations incorporate that practice, idea, or concept.

Please note:

- The highlighted performance expectations (i.e., 3-ESS2-3) are expectations that are different from the Next Generation Science Standards.
- The performance expectations marked with an asterisk (i.e., 3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
- The text in the "Disciplinary Core Ideas" section is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas unless it is preceded by (NYSED), (i.e. (NYSED) Earth's processes continuously cycle water, contributing to weather and climate. (3-ESS2-3))