K-5 NYSSLS Progressions: Science and Engineering Practices (SEP)

→ INCREASING SOPHISTICATION OF STUDENT THINKING →

Science and Engineering Practices	K–2 Practices	3–5 Practices
Asking Questions and Defining Problems A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world(s) works and which can be empirically tested. Engineering questions clarify problems to determine criteria for successful solutions and identify constraints to solve problems about the designed world. Both scientists and engineers also ask questions to clarify ideas.	Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.	Asking questions and defining problems in 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships.
	• Ask questions based on observations to find more information about the natural and/or designed world(s). **BOCES 4 Science Unit: Weather for Kindergarten (Grade K)** **BOCES 4 Science Unit: Sky Patterns (Grade 1)*** **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)*** **BOCES 4 Science Unit: Save the Bees (Grade 2)***	• Ask questions about what would happen if a variable is changed. **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)*** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)***
	• Ask and/or identify questions that can be answered by an investigation. **BOCES 4 Science Unit: Sky Patterns (Grade 1)*** **BOCES 4 Science Unit: Earth's Features (Grade 2)***	• Identify scientific (testable) and non-scientific (nontestable) questions. **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)*** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)*** • Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. **BOCES 4 Science Unit: Invisible Forces (Grade 3)** **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)*** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)*** **BOCES 4 Science Unit: Where are the Wolves? (Grade 3)*** **BOCES 4 Science Unit: Powering Thru the Fair (Grade 4)** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)*** **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)*** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)*** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)***
	• Define a simple problem that can be solved through the development of a new or improved object or tool. **BOCES 4 Science Unit: A Bunny's Life (Grade 1)*** **BOCES 4 Science Unit: Sky Patterns (Grade 1)***	• Use prior knowledge to describe problems that can be solved. **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)*** • Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)***

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K-5 NYSSLS Progressions: Science and Engineering Practices (SEP)

→ INCREASING SOPHISTICATION OF STUDENT THINKING →

Science and Engineering Practices	K–2 Practices	3–5 Practices
Developing and Using Models A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations. Modeling tools are used to develop questions, predictions and explanations; analyze and identify flaws in systems; and communicate ideas. Models are used to build and revise scientific explanations and proposed engineered systems. Measurements and observations are used to revise models and designs.	Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.	Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
	• Distinguish between a model and the actual object, process, and/or events the model represents. **BOCES 4 Science Unit: Earth's Features (Grade 2)** • Compare models to identify common features and differences.	• Identify limitations of models. **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)** **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)*** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 4)** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)**
	• Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s). **BOCES 4 Science Unit: Worm Scouts (Grade K)** **BOCES 4 Science Unit: A Bunny's Life (Grade 1)*** **BOCES 4 Science Unit: Sky Patterns (Grade 1)*** **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)*** **BOCES 4 Science Unit: Earth's Features (Grade 2)**	• Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events. **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 4)** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)** • Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution. **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)** **BOCES 4 Science Unit: Got Water? (Grade 5)** **BOCES 4 Science Unit: Toys Matter (Grade 5)** • Develop and/or use models to describe and/or predict phenomena. **BOCES 4 Science Unit: Invisible Forces (Grade 3)*** **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)*** **BOCES 4 Science Unit: Where are the Wolves? (Grade 3)*** **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)*** **BOCES 4 Science Unit: Powering Thru the Fair (Grade 4)*** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)**

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→ INCREASING SOPHISTICATION OF STUDENT THINKING →

		BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)
	• Develop a simple model based on evidence to represent a proposed object or tool. **BOCES 4 Science Unit: Weather for Kindergarten (Grade K)*** **BOCES 4 Science Unit: A Bunny's Life (Grade 1)*** **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)*** **BOCES 4 Science Unit: Earth's Features (Grade 2)** **BOCES 4 Science Unit: Save the Bees (Grade 2)**	• Develop a diagram or simple physical prototype to convey a proposed object, tool, or process. **BOCES 4 Science Unit: Powering Thru the Fair (Grade 4)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)** • Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system. **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)*** **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)*** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)*** **BOCES 4 Science Unit: Got Water? (Grade 5)** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)**

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K-5 NYSSLS Progressions: Science and Engineering Practices (SEP)

→ INCREASING SOPHISTICATION OF STUDENT THINKING →

Science and Engineering Practices	K–2 Practices	3–5 Practices
Planning and Carrying Out Investigations Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters. Engineering investigations identify the effectiveness, efficiency, and durability of designs under different conditions.	Planning and carrying out investigations to answer questions or test solutions to problems in K– 2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.	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.
	• With guidance, plan and conduct an investigation in collaboration with peers (for K). **BOCES 4 Science Unit: Pushes and Pulls (Grade K)** • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. **BOCES 4 Science Unit: Sky Patterns (Grade 1)** **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)** **BOCES 4 Science Unit: Made of Matter (Grade 2)** **BOCES 4 Science Unit: Save the Bees (Grade 2)**	• 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. **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)*** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)*** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)*** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)***
	• Evaluate different ways of observing and/or measuring a phenomenon to determine which way can answer a question.	• Evaluate appropriate methods and/or tools for collecting data. **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** **BOCES 4 Science Unit: Toys Matter (Grade 5)**
	• Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons. **BOCES 4 Science Unit: Weather for Kindergarten (Grade K)** **BOCES 4 Science Unit: Sky Patterns (Grade 1)** **BOCES 4 Science Unit: Save the Bees (Grade 2)** • Make observations (firsthand or from media) and/or measurements of a proposed object or tool or solution to determine if it solves a problem or meets a goal. **BOCES 4 Science Unit: A Bunny's Life (Grade 1)*** • Make predictions based on prior experiences.	• 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. **BOCES 4 Science Unit: Invisible Forces (Grade 3)** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)** **BOCES 4 Science Unit: Powering Thru the Fair (Grade 4)** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)*** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)*** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)***

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K-5 NYSSLS Progressions: Science and Engineering Practices (SEP)

→ INCREASING SOPHISTICATION OF STUDENT THINKING →

	BOCES 4 Science Unit: Sky Patterns (Grade 1)	**BOCES 4 Science Unit: Got Water? (Grade 5)*** • Make predictions about what would happen if a variable changes. **BOCES 4 Science Unit: A Walk in the Park (Grade 4)*** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)** • Test two different models of the same proposed object, tool, or process to determine which better meets criteria for success. **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** **BOCES 4 Science Unit: Toys Matter (Grade 5)**

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→ INCREASING SOPHISTICATION OF STUDENT THINKING →

Science and Engineering Practices	K–2 Practices	3–5 Practices
Analyzing and Interpreting Data Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results. Modern technology makes the collection of large data sets much easier, providing secondary sources for analysis. Engineering investigations include analysis of data collected in the tests of designs. This allows comparison of different solutions and determines how well each meets specific design criteria—that is, which design best solves the problem within given constraints. Like scientists, engineers require a	Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.	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.
	• Record information (observations, thoughts, and ideas). **BOCES 4 Science Unit: A Bunny's Life (Grade 1)*** **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)*** • Use and share pictures, drawings, and/or writings of observations. **BOCES 4 Science Unit: Pushes and Pulls (Grade K)** • Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems. **BOCES 4 Science Unit: Weather for Kindergarten (Grade K)** **BOCES 4 Science Unit: Worm Scouts (Grade K)** **BOCES 4 Science Unit: Sky Patterns (Grade 1)** **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)*** **BOCES 4 Science Unit: Save the Bees (Grade 2)***	• Represent data in tables and/or various graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships. **BOCES 4 Science Unit: Invisible Forces (Grade 3)*** **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** **BOCES 4 Science Unit: Where are the Wolves? (Grade 3)** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)*** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)** **BOCES 4 Science Unit: Toys Matter (Grade 5)***
	• Compare predictions (based on prior experiences) to what occurred (observable events). **BOCES 4 Science Unit: Sky Patterns (Grade 1)** **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)***	• Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation. **BOCES 4 Science Unit: Invisible Forces (Grade 3)*** **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** **BOCES 4 Science Unit: Where are the Wolves? (Grade 3)** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)*** **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)*** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)** **BOCES 4 Science Unit: Toys Matter (Grade 5)*** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)***

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range of tools to identify patterns within data and interpret the results. Advances in science make analysis of proposed solutions more efficient and effective.		• Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings. **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** **BOCES 4 Science Unit: Where are the Wolves? (Grade 3)** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)** **BOCES 4 Science Unit: Got Water? (Grade 5)***
	• Analyze data from tests of an object or tool to determine if it works as intended. **BOCES 4 Science Unit: Pushes and Pulls (Grade K)** **BOCES 4 Science Unit: Made of Matter (Grade 2)**	• Analyze data to refine a problem statement or the design of a proposed object, tool, or process. • Use data to evaluate and refine design solutions. **BOCES 4 Science Unit: Toys Matter (Grade 5)***

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Science and Engineering Practices	K–2 Practices	3–5 Practices
Using Mathematics and Computational Thinking In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; solving equations exactly or approximately; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions.	Mathematical and computational thinking in K–2 builds on prior experience and progresses to recognizing that mathematics can be used to describe the natural and designed world(s).	Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.
	• Decide when to use qualitative vs. quantitative data.	• Decide if qualitative or quantitative data are best to determine whether a proposed object or tool meets criteria for success.
	• Use counting and numbers to identify and describe patterns in the natural and designed world(s). **BOCES 4 Science Unit: Sky Patterns (Grade 1)***	• Organize simple data sets to reveal patterns that suggest relationships. **BOCES 4 Science Unit: Invisible Forces (Grade 3)*** **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)*** **BOCES 4 Science Unit: Got Water? (Grade 5)** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)***
	• Describe, measure, and/or compare quantitative attributes of different objects and display the data using simple graphs.	• Describe, measure, estimate, and/or graph quantities such as area, volume, weight, and time to address scientific and engineering questions and problems. **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)*** **BOCES 4 Science Unit: Got Water? (Grade 5)** **BOCES 4 Science Unit: Toys Matter (Grade 5)**
	• Use quantitative data to compare two alternative solutions to a problem.	• Create and/or use graphs and/or charts generated from simple algorithms to compare alternative solutions to an engineering problem.

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Science and Engineering Practices	K–2 Practices	3–5 Practices
Constructing Explanations and Designing Solutions The end-products of science are explanations and the end products of engineering are solutions. The goal of science is the construction of theories that provide explanatory accounts of the world. A theory becomes accepted when it has multiple lines of empirical evidence and greater explanatory power of phenomena than previous theories. The goal of engineering design is to find a systematic solution to problems that is based on scientific knowledge and models of the material world. Each proposed solution results from a process of balancing competing criteria of desired functions, technical feasibility, cost, safety, aesthetics, and compliance with legal requirements. The optimal choice depends on how well the proposed solutions meet criteria and constraints.	Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.	Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.
	• Use information from observations (firsthand and from media) to construct an evidence-based account for natural phenomena. **BOCES 4 Science Unit: Pushes and Pulls (Grade K)*** **BOCES 4 Science Unit: A Bunny's Life (Grade 1)** **BOCES 4 Science Unit: Sky Patterns (Grade 1)*** **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)** **BOCES 4 Science Unit: Made of Matter (Grade 2)** **BOCES 4 Science Unit: Earth's Features (Grade 2)** **BOCES 4 Science Unit: Save the Bees (Grade 2)***	• Construct an explanation of observed relationships (e.g., the distribution of plants in the back yard). **BOCES 4 Science Unit: A Walk in the Park (Grade 4)** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)***
		• Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem. **BOCES 4 Science Unit: Invisible Forces (Grade 3)*** **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)***
		• Identify the evidence that supports particular points in an explanation. **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)** **BOCES 4 Science Unit: Powering Thru the Fair (Grade 4)** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)*** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)***
	• Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem. **BOCES 4 Science Unit: Weather for Kindergarten (Grade K)** **BOCES 4 Science Unit: A Bunny's Life (Grade 1)** **BOCES 4 Science Unit: Earth's Features (Grade 2)**	• Apply scientific ideas to solve design problems. **BOCES 4 Science Unit: Powering Thru the Fair (Grade 4)** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)***

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	• Generate and/or compare multiple solutions to a problem. **BOCES 4 Science Unit: Earth's Features (Grade 2)**	• Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. **BOCES 4 Science Unit: Earth's Processes in New York State (Grade 4)** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)**

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Science and Engineering Practices	K–2 Practices	3–5 Practices
Engaging in Argument from Evidence Argumentation is the process by which evidence-based conclusions and solutions are reached. In science and engineering, reasoning and argument based on evidence are essential to identifying the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation to listen to, compare, and evaluate competing ideas and methods based on merits. Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, resolving questions about measurements, building data models, and using evidence to evaluate claims.	Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).	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).
	• Identify arguments that are supported by evidence. • Distinguish between explanations that account for all gathered evidence and those that do not. • Analyze why some evidence is relevant to a scientific question and some is not. • Distinguish between opinions and evidence in one's own explanations.	• Compare and refine arguments based on an evaluation of the evidence presented. **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** • Distinguish among facts, reasoned judgment based on research findings, and speculation in an explanation. **BOCES 4 Science Unit: A Walk in the Park (Grade 4)***
	• Listen actively to arguments to indicate agreement or disagreement based on evidence, and/or to retell the main points of the argument. **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)**	• Respectfully provide and receive critiques from peers about a proposed procedure, explanation or model.by citing relevant evidence and posing specific questions. **BOCES 4 Science Unit: Toys Matter (Grade 5)*** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)**
	• Construct an argument with evidence to support a claim. **BOCES 4 Science Unit: Worm Scouts (Grade K)** **BOCES 4 Science Unit: Sky Patterns (Grade 1)*** **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)*** **BOCES 4 Science Unit: Made of Matter (Grade 2)** **BOCES 4 Science Unit: Earth's Features (Grade 2)*** **BOCES 4 Science Unit: Save the Bees (Grade 2)***	• Construct and/or support an argument with evidence, data, and/or a model. **BOCES 4 Science Unit: Invisible Forces (Grade 3)*** **BOCES 4 Science Unit: Where are the Wolves? (Grade 3)** **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)*** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)*** **BOCES 4 Science Unit: Powering Thru the Fair (Grade 4)*** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)*** **BOCES 4 Science Unit: Earth and Space Explorers (Grade 5)** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)** • Use data to evaluate claims about cause and effect. **BOCES 4 Science Unit: Invisible Forces (Grade 3)*** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)*** **BOCES 4 Science Unit: Toys Matter (Grade 5)***

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	• Make a claim about the effectiveness of an object, tool, or solution that is supported by relevant evidence. **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)*** **BOCES 4 Science Unit: Earth's Features (Grade 2)***	• 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. **BOCES 4 Science Unit: Where are the Wolves? (Grade 3)** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)**

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Science and Engineering Practices	K–2 Practices	3–5 Practices
Obtaining, Evaluating, and Communicating Information Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations as well as orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to obtain information that is used to evaluate the merit and validity of claims, methods, and designs.	Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new 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.
	• Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s). **BOCES 4 Science Unit: Weather for Kindergarten (Grade K)** **BOCES 4 Science Unit: A Bunny's Life (Grade 1)** **BOCES 4 Science Unit: Sky Patterns (Grade 1)*** **BOCES 4 Science Unit: Save the Bees (Grade 2)***	• Read and comprehend grade appropriate complex texts and/or other reliable media to summarize and obtain scientific and technical ideas and describe how they are supported by evidence. **BOCES 4 Science Unit: Where are the Wolves? (Grade 3)*** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** **BOCES 4 Science Unit: Powering Thru the Fair (Grade 4)** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)*** • Compare and/or combine across complex texts and/or other reliable media to support the engagement in other scientific and/or engineering practices.
	• Describe how specific images (e.g., a diagram showing how a machine works) support a scientific or engineering idea. **BOCES 4 Science Unit: Pushes and Pulls (Grade K)*** **BOCES 4 Science Unit: Sky Patterns (Grade 1)*** **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)***	• Combine information in written text with that contained in corresponding tables, diagrams, and/or charts to support the engagement in other scientific and/or engineering practices.

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→ INCREASING SOPHISTICATION OF STUDENT THINKING →

	• Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim. **BOCES 4 Science Unit: Pushes and Pulls (Grade K)*** **BOCES 4 Science Unit: A Bunny's Life (Grade 1)** **BOCES 4 Science Unit: Earth's Features (Grade 2)**	• Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. **BOCES 4 Science Unit: Invisible Forces (Grade 3)*** **BOCES 4 Science Unit: Where are the Wolves? (Grade 3)*** **BOCES 4 Science Unit: Generations of Butterflies (Grade 3)*** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)*** **BOCES 4 Science Unit: Powering Thru the Fair (Grade 4)** **BOCES 4 Science Unit: A Walk in the Park (Grade 4)*** **BOCES 4 Science Unit: Got Water? (Grade 5)** **BOCES 4 Science Unit: Toys Matter (Grade 5)*** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)***
	• Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas. **BOCES 4 Science Unit: Worm Scouts (Grade K)** **BOCES 4 Science Unit: A Bunny's Life (Grade 1)** **BOCES 4 Science Unit: Sky Patterns (Grade 1)*** **BOCES 4 Science Unit: Sending Messages with Light and Sound (Grade 1)*** **BOCES 4 Science Unit: Save the Bees (Grade 2)***	• Communicate scientific and/or technical information orally and/or in written formats, including various forms of media as well as tables, diagrams, and charts. **BOCES 4 Science Unit: Invisible Forces (Grade 3)*** **BOCES 4 Science Unit: Investigating Weather and Climate (Grade 3)** **BOCES 4 Science Unit: Riding the Waves of Information (Grade 4)*** **BOCES 4 Science Unit: Powering Thru the Fair (Grade 4)** **BOCES 4 Science Unit: Got Water? (Grade 5)** **BOCES 4 Science Unit: Deer, Deer Everywhere! (Grade 5)***

* addressed but not required