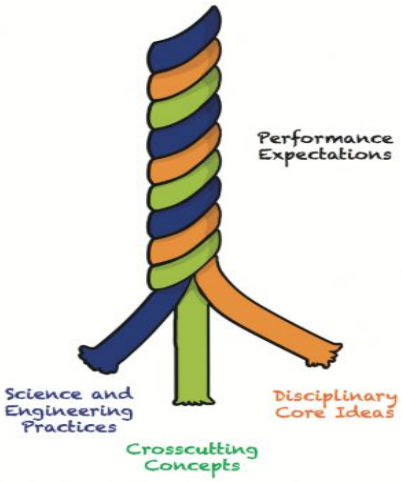
Rush-Henrietta Science Learning Guides K-6

An overview of our K-6 science curriculum

Science K:

In kindergarten, students begin to develop an understanding of the natural and designed world through exploration and investigation of life and physical sciences. Students will investigate answers to their own questions about the world by analyzing models, participating in investigations, and gathering evidence that can support their ideas and observations. Students will engage in a variety of hands-on activities to deepen their understanding of the following scientific **core ideas**:

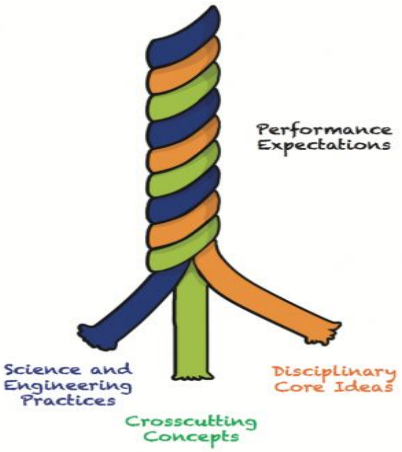
1) Solids and liquids
    - Making observations
    - Exploring the uses of solids and liquids
2) Weather
    - Analyzing patterns of day and night
    - Exploring the seasons
3) Life Cycles
    - Observing the egg to chicken life cycle



The crosscutting concepts of patterns, cause and effect, and system models are identified as organizing concepts for the core ideas listed above. The Kindergarten performance expectations rely heavily on students' abilities to utilize grade-appropriate **science and engineering practices** such as asking questions, using models, and carrying out investigations. Students are expected to use these practices to demonstrate their understanding of the core ideas listed above.

Science 1:

In first grade, science instruction will help to foster an understanding of scientific facts, concepts, and methods through hands-on learning and use of informational text. Students will participate in a variety of activities to deepen their understanding of the following scientific **core ideas**:

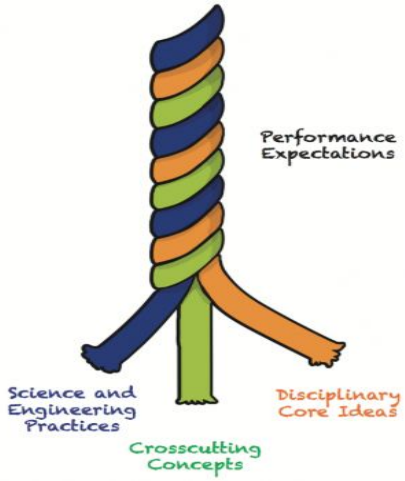


1) Magnets and Magnetism
    - Exploring forces
    - Analyzing the properties of metals
    - Comparing magnetic attraction to magnetic repulsion
2) Weather and Space Systems
    - Predicting the movement of the sun, moon, and stars
    - Observing the phases of the moon
    - Analyzing seasonal patterns on Earth
3) Organisms
    - Comparing human and animal body systems and functions
    - Exploring the inheritance of traits

The crosscutting concepts of patterns, cause and effect, structure and function, and influence of engineering/technology/science on society and the natural world are identified as organizing concepts for the core ideas listed above. The first grade performance expectations rely heavily on students' abilities to utilize grade-appropriate **science and engineering practices** such as: planning and carrying out investigations; analyzing data; constructing explanations and designing solutions; and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate their understanding of the core ideas listed above.

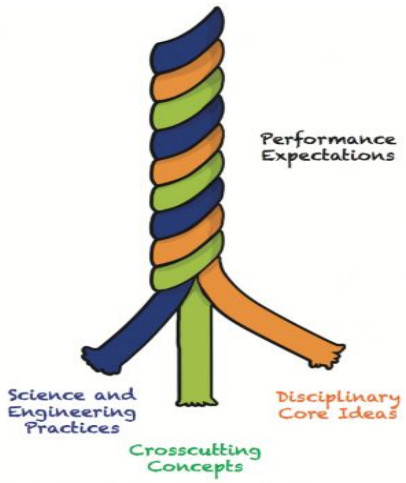
Science 2:
In second grade, science instruction will continue to develop students' understanding of scientific facts, concepts, and methods through hands-on learning and the use of informational text. Students will learn to appreciate and understand science, how it contributes to their lives and society, and how it impacts decisions made regarding the environment. Students will participate in a variety of activities to deepen their understanding of the following scientific **core ideas**:

1) Structure and Properties of Matter
    - Exploring the states of matter
    - Classifying matter based on its observable properties
    - Constructing and deconstructing larger objects
2) Earth Systems: Processes that Shape the Earth
    - Exploring erosive forces
    - Identifying the sources, locations, and uses of water
    - Exploring how human impacts the environment
3) Plant Growth: Interdependent Relationships in Ecosystems
    - Modeling how plants and animals depend on each other for survival
    - Exploring the diversity of plant and animal life in different habitats
4) Measurement
    - Identifying and using appropriate tools for measurement
    - Determining which properties of an object are measurable
    - Establishing the foundations of estimation



The crosscutting concepts of patterns, cause and effect, energy and matter, structure and function, stability and change, and influence of engineering/technology/science on society and the natural world are identified as organizing concepts for the core ideas listed above. The second grade performance expectations rely heavily on students' abilities to utilize grade-appropriate **science and engineering practices** such as: developing and using models; planning and carrying out investigations; analyzing and interpreting data; constructing explanations; designing solutions; engaging in arguments from evidence; and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate their understanding of the core ideas listed above.

Science 3:
In third grade, students will continue to develop the foundational skills necessary to succeed in the scientific/research process. Emphasis will be placed on the skills of observing, predicting, collecting data, analyzing, and drawing conclusions based on evidence as students participate in a variety of inquiry-based and problem solving experiences to enhance their knowledge and understanding of the following **core ideas**:

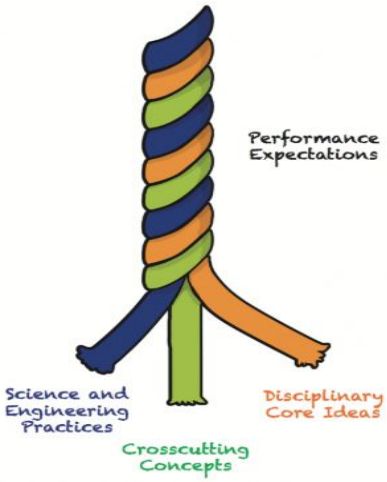


1) Forces and Interactions
    - Identifying various types of forces and interactions
    - Observing and measuring forces and interactions
    - Predicting future forces and interactions
2) Weather and Climate
    - Researching various climates around the world
    - Analyzing various weather variables that contribute to weather forecasts
    - Discussing how humans can prepare for and respond to changes in weather and climate
3) Interdependent Relationships in Ecosystems
    - Studying groups of animals and the roles/functions each member contributes to the group
    - Exploring ways in which animals adapt to their changing environments
    - Analyzing fossils to predict the conditions in which life forms lived in long ago
4) Inheritance and Variation of Traits: Life Cycles and Traits
    - Determining how and why some traits get passed down and others do not
    - Exploring the connection between environmental conditions and the inheritance of traits
    - Analyzing the life cycles of various life forms

The crosscutting concepts of patterns, cause and effect, scale/proportions/quantities, systems and system models, interdependence, and the influence of engineering/technology/science on society and the natural world are identified as organizing concepts for the core ideas listed above. The third grade performance expectations rely heavily on students' abilities to utilize grade-appropriate **science and engineering practices** such as: asking questions and defining problems; developing and using models; planning and carrying out investigations; analyzing and interpreting data; constructing explanations and designing solutions; engaging in arguments from evidence; and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate their understanding of the core ideas listed above.

Science 4:
In fourth grade, students will engage in science to enhance their academic skills, independence, and confidence. Students will continue to select and read informational texts to solidify their understanding of the scientific concepts presented to them. Students will participate in a variety of hands-on activities to deepen their understanding of the following scientific **core ideas**:

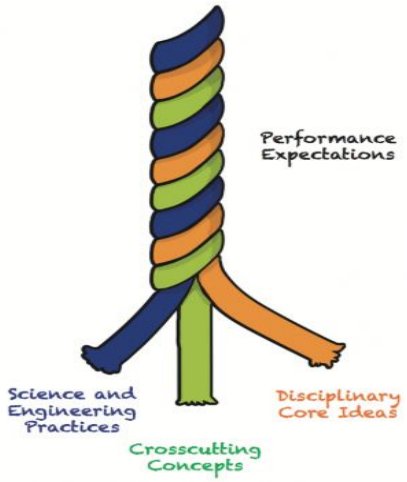
1) Waves and Information
    - Modeling wave properties such as wavelength and amplitude
    - Coding and decoding information using various codes
2) Food Webs in Ecosystems
    - Identifying the traits and characteristics of species that give them an advantage in survival
    - Modeling and predicting predator/prey relationships in ecosystems
    - Making inferences about how shifting animal populations affect the dynamics of an ecosystem
3) Structure, Function, and Information Processing
    - Modeling how sensing light results in vision
    - Exploring the internal structures of plants and animals
    - Modeling how plants and animals receive and process information
4) Energy
    - Analyzing the transfer of energy from one object to another
    - Determining how and when energy is converted from one form to another
    - Understanding how energy has contributed to new and improved technologies
5) Earth's Systems: Processes that Shape the Earth
    - Using evidence to determine the changes in Earth's landscape overtime
    - Identifying and quantifying various forms of weathering and erosion
    - Evaluating the impact of natural disasters on human life



The crosscutting concepts of patterns, cause and effect, energy and matter, systems and system models, interdependence, and the influence of engineering/technology/science on society and the natural world are identified as organizing concepts for the core ideas listed above. The fourth grade performance expectations rely heavily on students' abilities to utilize grade-appropriate **science and engineering practices** such as: asking questions; developing and using models; planning and carrying out investigations; analyzing and interpreting data; constructing explanations and designing solutions; engaging in arguments from evidence; and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate their understanding of the core ideas listed above.

Science 5:
In fifth grade, the science program provides students with opportunities to continue to develop their interdisciplinary problem-solving skills as they begin to understand the relationships and common themes that connect science, mathematics, technology, and literacy. Students will participate in a variety of hands-on activities to deepen their understanding of the following scientific **core ideas**:

1) Matter and Energy in Organisms and Ecosystems
    - Modeling the transfer and disbursement of energy within and throughout an ecosystem
    - Modeling the transfer and disbursement of matter within and throughout an ecosystem
2) Structure and Properties of Matter
    - Modeling the various types and phases of matter
    - Conducting experiments to validate the law of Conservation of Matter
    - Identifying and quantifying the various properties of matter
    - Exploring the difference between chemical and physical changes

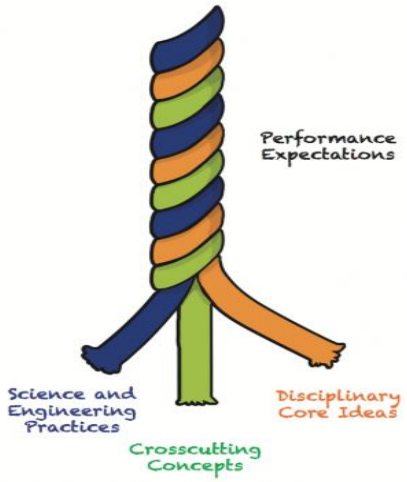


3) Earth Systems
    - Modeling the Earth from its core to outer space
    - Exploring the distribution of water on Earth
    - Designing ways communities could use scientific ideas to protect the Earth's resources and its environment
4) Space Systems: Stars and the Solar Systems
    - Predicting patterns associated with the movement of the Earth, sun, moon, and stars
    - Understanding the impact that Earth's rotation and revolution has on weather and climate
    - Describing how the force of gravity impacts the current model of our solar system

The crosscutting concepts of patterns, cause and effect, scale/proportion/quantity, energy and matter, stability and change, interdependence, and systems/system models are identified as organizing concepts for the core ideas listed above. The fifth grade performance expectations rely heavily on students' abilities to utilize grade-appropriate **science and engineering practices** such as: developing and using models; planning and carrying out investigations; analyzing and interpreting data; using mathematical and computational thinking; engaging in arguments from evidence; and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate their understanding of the core ideas listed above.

Science 6:
In 6th grade, science instruction relies heavily on the use of technology to allow students to make deeper-level connections with the content presented to them. Students will continue to develop their interdisciplinary problem-solving skills as they further solidify their knowledge and understanding of the relationships and common themes that connect science, mathematics, technology, and literacy. Students will participate in a variety of hands-on activities to deepen their understanding of the following scientific **core ideas**:

1) Waves and Electromagnetic Radiation
    - Modeling the different properties used to describe waves
    - Exploring how waves travel through various materials
    - Comparing the reliability of digital and analog signals
2) Energy
    - Exploring the factors that impact the kinetic and potential energy of an object
    - Designing a device to limit the amount of thermal energy transferred between objects
    - Comparing the design and uses of series and parallel electrical circuits
3) Structure and Properties of Matter
    - Modeling the atomic composition of various materials
    - Identifying unknown substances based on their densities
    - Designing a method to separate a complex physical mixture
4) Structure, Function, and Information Processing
    - Describing the structure and function of small components of larger organisms
    - Exploring the structure and function of various cell organelles
    - Connecting cellular structure and function to tissue, organs, and body systems
5) Human Impact ***(The Intermediate ISTE Capstone Unit)***
    - Investigating the various natural resources humans consume
    - Designing a solution to a problem caused by humans interacting with their environment
    - Communicating the solution to an audience using a technology-enhanced platform
6) Matter and Energy in Ecosystems
    - Recording and analyzing the transfer of energy as it flows through natural systems
    - Recording and analyzing the transfer of matter as it flows through natural systems



The crosscutting concepts of pattern, cause and effect, scale/proportion/quantity, energy and matter, structure and function, interdependence, and stability and change are identified as organizing concepts for the core ideas listed above. The sixth grade performance expectations rely heavily on students' abilities to utilize grade-appropriate **science and engineering practices** such as: asking questions and defining problems; using mathematical and computational thinking; engaging in arguments from evidence; developing and using models; planning and carrying out investigations; analyzing and interpreting data; and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate their understanding of the core ideas listed above.