

**Robert C. Parker School  
Science Curriculum  
Middle School**

As children explore the world around them, they gain a deeper understanding and appreciation for the interconnections in nature and science. Through connections in their life science, physical science and earth science classes, they begin to learn about and take part in conservation and activism. Our seventy-seven acres of meadows, woodlands, wetlands, and creeks are a natural workshop for science observation and discovery. Science studies are supported with field trips to museums and local nature sites, including an annual trip to Camp Chingachgook on Lake George. Cornell Cooperative Extension's Demonstration Gardens on our property provide an accessible resource. Students practice conservation through a recycling program coordinated by middle school students, composting, monitoring energy and resource use, and by collecting data from our solar panels. Students and teachers use our student-built greenhouse and raised-bed vegetable gardens, connecting curriculum to nature while providing vegetables for a local food pantry.

**Sixth and Seventh Grade**

Areas of Focus:

- Lab performance. Safety, scientific method, science lab journals and performance.
- Science investigation. What kind of questions can be answered using science?  
Asking and answering students' own questions
- Science in our everyday lives; participating in authentic river and stream data collection and research
- Science and technology relationship. Scientific laws can be applied to build complex structures.
- Scientific Method: Planning, experimenting, critiquing, and revising

**Year 1: Biology/Ecology**

Essential Question: How are we related to and rely on the world around us?

Key Themes:

- Local Ecology: What life is around us? How does environment influence diversity?  
Long term ecological plot study on Parker property
- Classification: How do we classify living things? Using Kingdom, Phylum, Class, Order, Family, Genus, Species
- Six Kingdoms overview/detail: Plants, Eubacteria, Archaeobacteria, Fungus, Protists, Animals
- Cellular Structure: How are we different and similar to other life forms? Parts of a cell, cell division, reproduction; creating model cells
- Plants and Pollution- Student created controlled experiments
- Solar energy and its' impact on life; comparing photosynthesis and photovoltaic panels; designing and building solar powered vehicles.
- Good Friends: Bacteria and Viruses: How can you prevent your good friends from getting sick?
- Genetics: How can the knowledge of genetics help feed the world?
- Evolution: How have living things changed over Relationships in Nature: How does life rely on life? Food webs, mutualism, natural resources
- Time and what are the mechanisms for this change? Genes and traits, DNA structure, Coevolution of flowers and pollinators

## **Year 2: Physics/Chemistry**

Essential Question: What are the properties and principles of matter and energy and how is energy related with force and movement?

### Key Themes

- Scientific Inquiry: What makes good science? Asking deep questions, designing valid experiments, communicating results
- History of Science: What are the science's landmark achievements and their impact on society? Great discoveries research, Famous Scientist project
- Energy: How do light, sound and electromagnetic waves differ?; Transverse and compression wave comparisons, Sound waves and hearing exploration, Design An Instrument project
- Heat and Energy Transfer: How does heat and energy travel and change? Students as Teachers projects
- Force and Motion: How do machines make work easier? Newton's Laws of Motion; Simple machines; Designing and building Rube Goldberg Machines
- Sustainable energy: How can sustainable energy be incorporated into our lives? Researching alternative energy types, building and experimenting with water wheels and turbines
- Matter: What are things made of? Property and states of matter; Atoms and the Periodic Table of the Elements; Create an Element Children's book
- Chemical Properties and Reactions: What's in my food and water and how is it related to my health? Food chemistry experiments, Food additives, preservative, and colorings project, Healthy water project.

## **Grade 8**

### **Areas of Focus:**

- Lab performance. Safety, scientific method, science lab journals and performance.
- Science investigation. What kind of questions can be answered using science? Asking and answering students' own questions
- Science in our everyday lives; participating in authentic data collection and research utilizing the school property and natural phenomena
- Science and technology relationship. Scientific laws can be applied to build complex structures.
- Scientific Method: Planning, experimenting, critiquing, and revising
- Test taking skills

## **Earth Science**

Essential Question: How are the structures and physical cycles of Earth's systems interrelated and how do they influence life?

### Guiding Questions

- How does the flow of energy drive the cycling of matter?
- The Earth system is a Complex Adaptive System. How has the Earth changed over time?
- How do humans and the environment impact each other?
- To understand time and the scale of space, models and maps are necessary. What makes a good model?

## Units:

- Our Local Environment: What observations and inferences can we make about the Earth based on our daily experiences and how do you investigate them? The atmosphere, hydrosphere, lithosphere, and biosphere: how do they affect one another? Outdoor investigations
- Measuring Earth: How are models and maps used to communicate Earth's features? How has technology changed models and maps over time? Topography/GPS project
- Energy in Earth's System: How does energy move through and affect Earth's spheres? How do the properties of matter influence energy transfer? Conduction, Convection, Radiation project
- Meteorology and Climate; How does water cycle through Earth's spheres and how does it influence us? How does wind influence weather and how does the Earth motions and features affect wind? How are weather events categorized and predicted? How does the greenhouse effect help us and hinder us? What is climate? How does the structure of the Earth and the atmosphere influence climate? How has weather and climate changed over time and how have human activities influenced the atmosphere? Weather/ Climate project of choice
- Groundwater and Surface Processes: What is erosion and how does it affect our landscape? How has the landscape changed over time? What are glaciers and how do they reshape Earth's surface? How does soil and groundwater influence life and how do we manage these resources?
- Rocks and Minerals: What are rocks and minerals and how do they form? What is the rock cycle? How do we classify and identify rock and minerals? How are natural resources important to humans? What are renewable and nonrenewable resources? How does human activity and resource use impact our environment? Mystery Rock Challenge
- Earth's History: How has the Earth changed over time, physically and biologically? What are fossils and how do we age them? How do fossils help us organize geologic time? Time Period Travel Brochure project
- Dynamic Earth: What are the forces from within the Earth that change the surface landforms' shapes and locations? How do tectonic plates move? Where are volcanoes and earthquakes likely to occur and what are their effects? How do we measure earthquake location and magnitude? Plate Tectonics project of choice
- Astronomy: How does the sun impact us? How does earth, and other planets, move around the sun? What are the characteristics of the moon and how does it influence us? How do we know about the universe? How is the universe structured? How did the universe begin and how do we know it is expanding? What are characteristics of stars and what is their lifecycle? Modeling Earth's motions, Shadow tracking
- Living in Balance (ongoing during entire year): How do human actions influence natural cycles? How do scientists create long term prediction? What actions can we take to live sensibly with nature? Discussions and action project of choice
- Regents Test Preparation (ongoing during Spring): Study skills, exam language, performance test skills, and content review