Nassau BOCES Outdoor & Environmental Education

Instructional Plan:
Glacial Geology for Physical Setting/Earth Science

The overlying objective of the Nassau BOCES Geology Program is to provide specific content aligned to each grades' science curriculum while also providing real world applications for NYS ELA and Math Common Core Standards. Alignments are on reverse side of this document.

We are more than just a field trip… we provide a learning environment for your students!

Students using a transect line.

Students will also collect and identify rock specimens and observe the natural processes that have shaped Long Island

Vocabulary (teacher may add to list or request emphasis)

glacier	moraine	sorting
erosion	outwash	igneous
metamorphic	sedimentary	till
rock cycle	weathering	loess
deposition	erratic	

Program Logistics:

- Gropup Size: 15 students/naturalist
- 1 adult chaperone/student group
- 1.5-2 hr program and is typically combined with another program.
- The Pond is located at Caumsett State Historic Park. The Program is also possible at a location near your school.

Call for pricing and to schedule:

516-396-2264

See us online:

www.nassauboces.org/outdoors

Lesson Objectives: Students will be able to…

Explain the formation of Long Island in terms of:

- Glaciers
- Timeline
- Moraines
- Erosion
- Deposition
- North vs. South shore

Identify Rocks

- Sedimentary
- Igneous
- Metamorphic

Describe the origin of the large boulders on the beach

Describe the differences in wave action at north and south shore beaches

Demonstrate the appropriate use of field study tools (rock hammers, GPS units and/or transect/quadrats)

Activities (can include but not limited to):

- Observing properties of natural materials (color, shape, size, texture)
- Observing, collecting, and sorting rocks and minerals
- Modeling the action of a glacier and comparing a south shore beach (Jones) to the observed north shore coastline and wave action.
- Use of rock hammers to break open rocks to observe signs of weathering and look for fossils
- Earthcaching: using GPS units to locate natural features.
- Use of topographic maps.
- Use of transect line/quadrats to observe sorting of natural materials.

Assessment

- The program will end with a summative "Q & A."
- The teacher may elect to have students complete data sheets and/or writing activities back in the classroom.

nassau BOCES Board of Cooperative Educational Services

Outdoor & Environmental Education • Department of Business Services
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Standard Alignments for Glacial Geology Program for Physical Setting			
Standards Type	**Key Standards or Code**	**Standard Description**	**Instructional Activities**
NYS Science Core Curriculum	**Standard 1:** Analysis, Inquiry and Design ***Scientific Inquiry***	**Key Idea 1:** To develop explanations of natural phenomena in a continuing creative process. **Key Idea 3:** The observations made while testing proposed explanations provide new insights into phenomena	Students will use charts and topo maps to understand concepts such as contour isolines. Students will observe natural sorting and deposition through a transect study and witness tidal changes using simple markers.
	Standard 6 Interconnected-ness: Common Themes ***Magnitude/Scale; Patterns of Change***	**Key Idea 3:** The grouping of magnitudes of size, time, frequency and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems. **Key Idea 5:** Identifying patterns of change is necessary for making predictions about future behavior and conditions.	Students will use topographic map of Caumsett to determine distances and elevations. GPS units can be used to check for student accuracy. Students will interpret the nature of cyclic change: tides, tidal ranges.
	Standard 4 Physical Setting ***Key Idea 1*** ***Key Idea 2*** ***Key Idea 3***	**Performance Indicator 1.1f:** The Earth and celestial phenomena can be described by principles of relative motion and perspective. **1.2g:** Porosity, permeability, and water retention affect runoff and infiltration **1.2i and 1.2j:** Fossil evidence indicates a wide variety of life forms existed and those preserved in rocks provide information about past conditions. **2.1q:** Topographic maps represent landforms through the use of contour lines **2.1s thru 2.1w:** Weathering; natural agents of erosion; patterns of deposition. **3.1a-3.1c:** Explain the properties of materials in terms of the arrangement and properties of the atoms that compose them **(**Minerals- properties, identification**).**	**1.1:** Students will observe the effects of the Earth's position with regard to the Sun and Moon – tides, tidal ranges, storm tides. **1.2g:** Students will test/compare the porosity of sand vs. soil. **1.2i and j:** Using rock hammers, students will observe fossil evidence. **2.1q:** Students will use topo maps to determine elevation and distances **2.1s thru 2.1w:** Students will observe patterns of deposition; model the glacial formation of LI; quantify the sorting of natural materials; observe evidence of erosion. **3.1a-3.1c:** Students will collect and classify rock samples based on type; discuss the rock cycle.
NYS Common Core	**Supporting Standards**	**Description**	**Instructional Activities**
Math	Operations and Algebraic Thinking	**Grade 3:** Represent and solve problems involving multiplication and division. **Grade 4:** Use the four operations with whole numbers to solve problems. **Grade 5:** Write and interpret numerical expressions. Analyze patterns and relationships.	Activities involving transect studies aid in the observation of natural sorting by wind and water action along the shoreline and involve the use of numerical data to propose ideas of patterns and relationships.
Math	Number and Operations in Base Ten	**Grade 3:** Use place value understanding and properties of operations to perform multi-digit arithmetic. **Grade 4:** Use place value understanding and properties of operations to perform multi-digit arithmetic. **Grade 5:** Understand the place value system. Perform operations with multi-digit whole numbers and with decimals to hundredths.	
Math	Measurement and Data	**Grade 3:** Represent and interpret data. **Grade 4:** Represent and interpret data. **Grade 5:** Represent and interpret data.	
ELA College and Career Anchor Standards ***Speaking and Listening*** Grades 6-12	Comprehension & Collaboration	1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.	Students will participate in conversations related to their observations and data collection.
	Presentation of Knowledge and Ideas	4. Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.	Students in pairs or in groups of 3-4 will be responsible for presenting their observations/collections of samples to the larger group
	Vocabulary Acquisition and Use	4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.	Students will use content-driven vocabulary throughout the program and practice the use of root words, prefixes and suffixes to determine meaning (example: macro, micro)