Geology of the Hudson River

Unit: Life along the Hudson River: Exploring Nature and Culture

Destination(s)

Mid-Hudson Childrens Museum

75 North Water St

Poughkeepsie, NY 12601
http://www.mhcm.org

County

Dutchess

Grades

3rd Grade, 2nd Grade, 1st Grade

Author

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Summary

Students develop a geological perspective and understanding of the powerful forces of nature. They will explore concepts in the classroom with hands-on activities and also visit the Hudson River to make their own observations. Students get a physical overview of how the Hudson River Valley was formed over thousands of years. Activities are designed to allow children to construct their own
understandings. Students gain an appreciation of how glaciers and rivers can change landscapes over time.

**Question**

1. How was the Hudson River formed?
2. How does a glacier move?
3. Where is the source of the Hudson River?
4. How long is the Hudson River?
5. Where does each student live in relationship to the River?

**Content Understanding(s)**

- Glaciers move by creeping and by gliding on meltwater.
- Glaciers and rivers carved the Hudson River Valley.
- The Earth's crust is split into seven major pieces and many minor pieces called plates which can be described using the terms "oceanic" and "continental."
- Geologists can study rock layers in order to measure time.
- The three families of rocks -- igneous, sedimentary and metamorphic.
- The Hudson River starts at Lake Tear of the Clouds on the side of Mt. Marcy in the Adirondacks and travels 315 miles down to Manhattan.

**Concept Understanding(s)**

- Mapmaking -- students will make a map showing their house in relation to the Hudson River.
- Understand the contour of the river by piecing together a giant jigsaw puzzle.

**Vocabulary**

- crystals
- glacier
- creep
- meltwater
- crevasses
- icebergs
- ice age
- plates
- crust
Suggested Time Frame(s)

We taught this material in depth over about a month. Every Monday we spent an hour or more introducing a concept. Tuesday, Wednesday, and Thursday we had hands-on activities supporting the concept. On Friday, we reviewed the concepts and had the children record their understanding in journals.

We suggest that you use an entire day for the field trip to the Mid-Hudson Children's Museum and the Clearwater Pumpkin Sail. If you have time between activities, have the children do watercolors of Hudson River landscapes.

Narrative

Pre-Visit Activities

Glacier Glide. Working in pairs, students spread Cuisenaire rods out on the floor or a table. Have them take turns driving a round plastic cup through the rods. At the end of the slow push, there should be a "river" formed behind the path of the cup. For an impressive finale, spread all the rods on a carpet and let the entire class make one huge river.

Cartographers. Cut a 10 foot length of white craft paper from a roll. At the top of the paper draw a quarter-sized circle and label it "Lake Tear of the Clouds." Next, draw a bird's eye view of the river; don't worry about exact shape. Now have the children add details such as bridges, major cities, and lighthouses. With teacher guidance, have students take a round sticker with their name on it, and place it approximately where their house would be on the map.
**Magma Slide.** Place a sheet of wax paper on a table and spread two spoonfuls of chocolate icing on the paper. Next, place two halves of a graham cracker on top of the icing. Have the children slide the crackers together; this will force the icing to erupt between the edges of the cracker.

**Sites**

**Mid-Hudson Children's Museum and Waryas Park in Poughkeepsie.** We began by hearing from the Museum's traveling exhibit coordinator. She brought out a series of interactive games that taught environmental concepts. She also had the children piece together a giant jigsaw puzzle of the entire Hudson River. After an hour, the children were free to explore and play with any exhibit.

Next, the children had lunch on picnic benches overlooking the river. After lunch we walked to the Waryas Park dock and followed the lead of the Clearwater staff. At the end of the field trip, we sat down with the children and they did watercolor paintings of the river. The paintings were hung back in our classroom and were wonderful reminders of our extraordinary trip.

**Post-visit Activities**

**River Maker.** In a playground sandbox, that is approximately 6x6 feet, use a shovel and pile the sand up in to a 3 foot high mountain. Let the children make designs with different colored sand. After the mountain is beautifully designed, give the children a garden hose or a pump sprayer to watch how rivers are formed. This activity really makes the abstract concepts more concrete.

**River Load.** You will need a bowl, wooden spoon, jug of water, and coarse sand. Place the sand in the bowl and pour in the water. Stir the water quickly with the wooden spoon without touching the sand. You will see that the moving water picks up the sand particles, or sediment, and moves them around. Remove the spoon and let the water settle. The large particles of sand should sink first since they are heavier. As the water slows, the smaller particles settle. Only moving water will carry any particles.

**Drainage Test.** You will need sphagnum moss, slate, bricks, sand or soil, plastic tray, hardboard, watering can, awl, watch, plastic window box. Make a hole at the bottom of one side of the tray with an awl. Fill the tray with moss. Position the tray, bricks, window box, and hardboard in a row. The hole in the tray should sit just over the hardboard at the end close to the window box. Fill the watering can
and pour the water evenly over the moss. Time and record how long it takes for the water to filter through the moss and trickle down the board. Repeat the experiment with soil or sand in the tray and then with limestone. Finally, place a piece of slate over the bricks. Pour water onto the slate and measure the time it takes for it to run off.

**Supplies Used**

**MHCM/ Waryas Park visit:** watercoloring supplies

**Glacier Glide:** Cuisenaire rods (available at many teacher supplies stores and online outlets), plastic cup

**Cartographers:** roll of white craft paper, stickers to label homes

**Magma Slide:** wax paper, spoon, icing, Graham crackers

**Drainage Test:** sphagnum moss, slate, bricks, sand or soil, plastic tray, hardboard, watering can, awl, watch with second hand or stopwatch

**Journaling:** small notebooks

**What Should Students Know At The End of This Lesson**

See understandings above.

**What Should Students Be Able To Do at the End of This Lesson**

See understandings above.

**How do you assess student learning?**

Have students keep a Hudson River journal that reflects their understandings through maps, illustrations, diagrams and questions and answers. Try to make time for them to write in the journal twice a week. Ask the children to reflect on an essential question and to write about what they have learned. We sometimes asked students to generate their own questions. And, we evaluate the children's understandings by asking questions during group discussions.

**Site Tips**
Mid-Hudson Children's Museum and Waryas Park. The Museum has interactive displays and models for children from pre-school to fourth grade. See the narrative section above for a description of the activities our students participated in. Waryas, a city park, is on the east bank of the Hudson at the foot of Poughkeepsie's Main Street. The Clearwater is a 60 foot sloop with a wonderful staff that teaches environmental concepts from their "floating classroom." (See resource list for web sites.)

We made our visit to the museum and park during Clearwater's annual Pumpkin Sail. This is a wonderful first experience to get the kids to the river for a few hours. Educators set up stations outdoors. (Some are similar to those at the Esopus Meadows trip described in the lesson called "Hands-On River Ecology, so plan ahead with Clearwater's educators of you intend to do both trips.)

There is a plankton station, a singing stop (where the kids will learn songs about the river), a fish identification and petting station, and a chance to go aboard the Clearwater. On board, students learn sloop terminology, move the tiller, and last but not least, pick out a pumpkin to take home.

**Chaperone Information**

Parent chaperones are needed in a 4 to 1 ratio at the Museum.