

Student Exploration Guide to Glacial Geology



A large glacial erratic on the shore at Caumsett State Historic Park Preserve

Get Ready to Explore!



This guide will prepare you for your field trip to study glacial geology at our north shore beach at Caumsett State Historic Park Preserve. You'll discover many types of rocks and sediments (some amazing animals and plants, too!) in your study of the geology that formed Long Island.

Caumsett is on the North Shore of Long Island. If it is a clear day on the date of your trip, you will be able to see the state of Connecticut and parts of Westchester County when you look north across the Long Island Sound - that is less than 6 miles away!



Caumsett was once the grand estate of Marshall Field III. The name Caumsett is a Matinecock Indian name which means "place by a sharp rock."

You'll find many such rocks as you walk along our beach so it is important to understand Long Island's geology.

What will happen on your Field Trip:

Your bus will arrive at our Nature Center and you will be assigned to a group. You and your classmates will be working together with one of our naturalists. A naturalist is an outdoor educator who has studied many topics about the natural world.

Our naturalists also know lots of great ways to help you understand the subjects you may be learning in school. But now, you will get to see it first hand - not just from seeing it in a book. It's a great and fun way to learn!



Don't forget to dress for the weather and the season! Dressing in layers is the best way to make sure you will enjoy your day.

Now... get ready to explore!

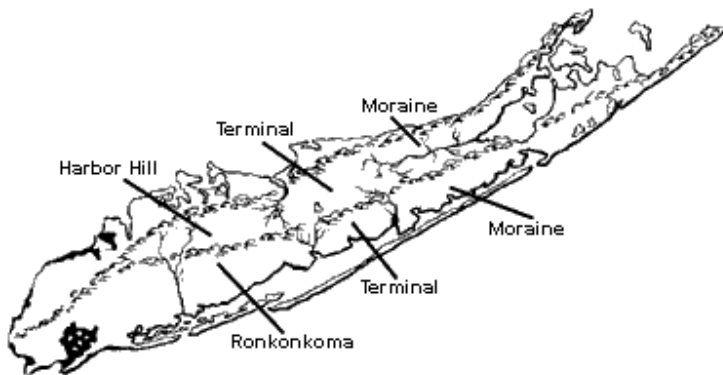
GLACIAL GEOLOGY - How was Long Island formed?

Long Island was formed by a huge continent-sized sheet of ice known as the Wisconsin Glacier. **Glaciers** are thick masses – up to two miles thick – of slow moving ice. The glacier moved southward about 60,000 years ago but stopped when the Earth's temperatures increased. Then, when temperatures decreased about 40 thousand years later, it moved southward again.

Both of these glacial movements were thousands of years apart yet they stopped in almost exactly the same spot! The eastern forks of Long Island, Montauk and Orient Point are what remain from these two glacial advances. The highest points on Long Island are found along the two **terminal moraines** known as the Harbor Hill and Ronkonkoma Moraines.



Graphic from cosmographicresearch.org



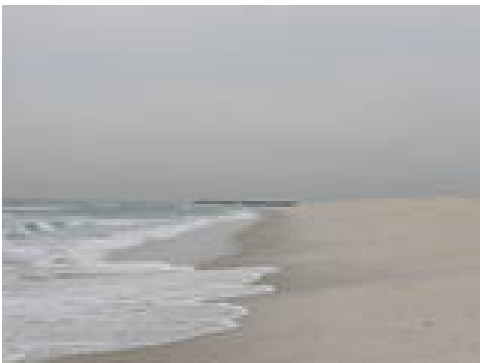
Boulders and pieces of rocks become frozen into the glacier and scrape over the land as it moves. Long Island was formed from the rocks, sand and silt brought here and deposited by the glacier.

This is called ice transport and there is evidence of this scraping in some of the large rocks, or **glacial erratics**, found on the beach at Caumsett State Park. **Ask your naturalist to show you!**

The north shore and south shore look so different from each other! Why?

The north shore of Long Island was formed by the leading edge of the glacier. Rocks – from the largest boulders to the finest clay (known as **till**) were carried along in the ice as if on a huge conveyor belt and were dropped at the base of the glacier.

Long Island, south of the Long Island Expressway is an outwash plain composed of well-sorted layers of clay, sand and gravel deposited by melt water streams. This is why the beaches of the south shore are sandy and those on the north shore are rocky.



Jones Beach, a south shore beach



Caumsett, a north shore beach

What types of rocks are found on north shore beaches?



All three types of rocks can be found at our beach: sedimentary, igneous and metamorphic.

You will find many “Indian paint pots” as you walk along the shoreline. These iron oxide **concretions** (a sedimentary type of rock) are clay-filled rocks that may break open from the action of the wind and waves and form hollow “pots.”

Quartz rocks, a type of igneous rock are very common, too. →



← Another example of a sedimentary rock is a **conglomerate** which is made up of rounded pebbles that look like they were cemented together.

→ A common metamorphic rock found on our beach is schist.



We may also find granite. Fossil imprints can be found in pieces of red shale and sandstone.



Granite



Sandstone



A fossil imprint

Where did the clay in the north shore cliffs come from?



Along the cliffs of Caumsett State Park, large deposits of **cretaceous clay** have been exposed by **erosion**. Extending under nearly all of Long Island is a massive wedge of sand, clay and gravel that was deposited by rivers emptying into a shallow sea 60 million years ago, during the **Cretaceous Period**.

After a heavy rain, we can find this clay washing out of the cliffs and into the Long Island Sound. →



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