



Themes to Encourage Awareness of Environmental Changes on the Shoreline of Connecticut in Elementary School Students: The Case of Kelsey Island

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The Text

The environment is one of the most important issues in the education of our youth in the United States and in the world today. Issues of the environment lend themselves to be developed in themes. It is of utmost importance and urgency to learn and get informed about environmental changes in the world so as to protect the limited resources for future generations. Our youth are the ones who will be making policy changes in the future in reference to environmental protection and development. Because of this reality it is necessary to instill awareness and respect for the environment in our future leaders. This is also a great opportunity to construct a curriculum unit integrating the scientific method, language, mathematics and social studies with a hands-on methodology. For our essay we have chosen to work on a small uninhabited island off the shore of Connecticut. This is Kelsey Island. This island is located at the mouth of the Farm River, off Branford in Long Island Sound.

In terms of global change, our premise is that Kelsey Island is enclosed in Long Island Sound in a way that Long Island Sound is enclosed in the Atlantic Coast and the Atlantic Coast is enclosed in the Atlantic Ocean. This ocean is finally enclosed in the world. These relationships present the opportunity of a fractal relationship: a microcosm within a microcosm. Changes in the environment taking place in Kelsey Island reflect changes in the environment that have taken place in Long Island Sound. At the same time, these changes reflect what has been going on in the larger picture of the Atlantic coast and the world in general. Man-made changes to the environment as well as changes that have taken place due to the forces of nature have affected the island, the Sound and the Atlantic Coast as well. For example, we might think of the changes in sea level during the last few thousand years due to the last glaciation and the changes in temperature when these majestic bodies of ice moved and melted.

This unit is for elementary school children, but it could be adapted for other levels. Elementary school children love to hear stories. It does not matter whether these stories deal with fiction, love, mathematics or science; they just love to hear stories. They also love to tell stories. This innate desire to tell and to listen is a resource that we want to encourage and nurture in our students at a tender age. We want to use these skills in the construction of this curriculum unit addressing issues of a changing environment in the shoreline of Connecticut. This changing environment in the shoreline of Connecticut echoes the changes in the larger

picture that represents the changing environment of the shoreline of the world. The trick in this pursuit is to be able to do it with interest for the student so that he or she would think and choose, would critique and analyze—in sum, would listen and tell critically. For this we have chosen two elements of construction. First, we have chosen to develop thematic blocks of meaning covering the main scientific concepts studied in the seminar, and at the same time, we want to apply a hands-on approach with the student in the elaboration and weaving of these themes. In other words, we work with appropriate themes with the students, making trips to the island, so as to gather information, through observations, collection of data, research, and interpretation of the data. Students are allowed to work individually or in groups. Let's remember that "students develop an understanding of the natural world when they are actively engaged in scientific inquiry—alone and with others." ¹ We hope that this double-edge method would lead us to the construction of themes told like stories. Sometimes they might be open-ended stories.

As we all understand, in science, open-ended stories are opportunities for further investigation. A student might find an answer to a problem that leads to further questions needing more answers. This sort of situation is very fruitful in a classroom. In our case the classroom is located in all places. This implies that students undertaking an investigation work on a given problem in the classroom as well as in any other place of their choice. If students learn to think scientifically, then, their classroom is everywhere. Presenting students the opportunity to work *in situ*, as in our present situation in the island, gives students the possibility to think scientifically wherever they go. In this manner, we dispel the concept of the classroom as the only place to learn. We instill in the student the appropriation of the environment around them through connections, balances, language to name it and rename it, and the consciousness that things are reachable and doable.

The surrounding environment becomes a textbook, and as such, students look upon nature with deference because the learning in this way is through images of nature, hands-on. Images of this kind are images carved in the spirit of freedom of the imagination, and a step away from the enclosure of walls. We are not insinuating that the classroom does not present the opportunities to think with freedom and to learn with pleasure. We all know that students love to go in field trips. They like it because they say that they like to have fun. Learning under these conditions, evidently, makes students understand the environment better. Students might like to change it and experiment with it, but not destroy it. I doubt seriously that students who learn from the environment as a classroom would take pleasure in hurting it, or would be easily persuaded to engage in actions leading to the destruction of the environment. Teachers are no longer the holders of the truth, but rather the guides of students in a relationship of mutual respect in the process of learning.

Some stories might have an ever-evolving end, waiting to be told and re-told, looking for an end. When we think about the life of a beach, we see that it shapes and re-shapes. The form of a beach comes and goes with the action of the water and the winds around it. ² Some stories of nature are like the life of a beach. They are the metaphor of the life of a beach. These stories are built with observations and hands-on experiences pieced together into a master story: the story of the effects of natural and human actions on the shoreline of Kelsey Island.

The Earth has endless stories to tell us. The Earth is an open book. When we learn how to listen and understand these stories we will be able to understand it better and will be able to preserve more resources for the future. Our students in the elementary school level have to begin to visualize the Earth as a text where they could find out information and raise questions of a multifaceted nature. Literacy, in this context, becomes an extended and an on-going process where students actually are learning not only from the written texts of the library media centers, but also from being able to open their senses to phenomena in the natural environment. Students learn how to record, organize and interpret pertinent information by observation of the

environment. They also understand that writing is essential in this type of setting. We gather data, and without explanations the data has not a full value. Consequently, students search for a way to keep track of the information and to make intelligible observations. A text has a code. When we learn how to work and understand a particular code, we learn from that text and begin to create another text with the code of the first text.

Opening the possibilities to make this type of inquiry for the students at the elementary school level is of great value. One thing leads to the next. If this shell has this particular shape, then, why is it that this other one over here is smaller and corrugated? Why is this barnacle larger than this other one attached to the rocks? What happens when the river water mixes with the water in the Sound? The answers to these questions lay in the observations and on the experiments that the students make. They formulate a hypothesis; get the materials necessary for experimentation; they lay out experiments and gather information and data through observations. Much of the quality of the work done at this level depends also on the previous knowledge that they bring with them. Research, other than the one in the field, also becomes important in the development of a well-rounded approach to a scientific investigation. Reading about the subject matter and comparing and contrasting information; combining texts into new ones are skills necessary in the production of a text.

The Island

In this curriculum unit we want to start our story with the creation of a map of Kelsey Island where the activities of our investigation take place. Kelsey Island is located off the coast of Branford, Connecticut, in Long Island Sound. ³ The island is located in the middle of Long Island Sound close to the north shore. In the western part of Branford, from the north runs the Farm River into Long Island Sound. This waterway divides East Haven and Branford. At the mouth of the river we find Kelsey Island. It is almost an extension of the mainland, in the form of a peninsula, but the Farm River cuts the island from the mainland on the west and a gut of the same river on the north. In a way, the river embraces the island from the north as it enters the Sound. In the same way, the water of the Sound embraces Long Island from the north as it enters the Atlantic Ocean. The area of the island is very irregular. Nonetheless, if we ignore the rocky points and protuberances of land, it has roughly the shape of an isosceles triangle, running from west to east, a third of a mile on each side, with a base facing south a little larger than its sides. One side faces the river; another faces the gut, and the base faces the sound.

At the north central and western part of the island is a rich area of life. This is the gut of the river. The marshes grow in the mainland also. The life forms of this marsh are typical of marshes in Connecticut. ⁴ A few feet from low tide, in the water of the beaches facing the Sound, there is a thick sediment of grayish clay. On the bed of the river there are clusters of shellfish, namely, clams, mussels and oysters. As in many places in Connecticut, these types of mollusks are common and abundant. All around the island on the rocks facing the water, there are barnacles of varied species and the common snail, small, relentless and ubiquitous. During the Fourth of July celebrations people of the region make some special dishes with the seafood of the area. About 100 feet from the mouth of the river the depth of the river is from 8 to ten feet. The bottom of the river is very muddy. It is about 600 feet wide. Here, the local folk dig for clams when the tide is low. They use these clams to make the famous New England clam chowder.

Making a map of the island proved to be a fun activity. At the same time we found out that it was full of surprises and questions. Sometimes it was difficult and time-consuming, but at the end it was rewarding. Students learned some skills and re-enforced other. Estimation was a skill that gave us the flexibility to curtail inundated land and deep water in the Sound when making measurements. Whenever an obstacle came in

front of us, we decided to either swim, get high waterproof boots, climb high rocks or just estimate using one of the objectives of the curriculum of science and mathematics. The method of mapping is the pace and compass. Several students helped in the mapping of the island at different times. ⁵

The procedure to make the map of the island is as follows: first we found a point on the island where we could start measurements. We used a Silva compass with a mirror. We used the mirror in the compass to find a geographical point. Once we had a point, we write down the bearings. Then, we started pacing to that given point counting the number of paces. One pace is two steps and each step was about one meter. We recorded the information and continued to the next spot of our choice until we covered the whole island. It took us a few days to gather this information. When we started making this map with a few students, using the pace and compass method, we realized that there were four main distinctive features on the island. There are three high rocky areas, and in the middle of them we find a relatively flat area composed of marshland and sandy beaches with a few rocky formations to the south. Coming in the river from the north, running W 20(S we find the first rocky area, covered with grasses, wild berries and short stumped pines, oaks, ciders, tulips and shrubs of all kinds common to the area. This area is about five meters above the high tide line. It starts at the mouth of the gut on the west of the river and it runs south for about 350 meter with a width of about ten to twenty meters. Ducks, seagulls and small birds love to sun and nest here. The rocks are loaded with seaweed and moss. The seagulls come to rest and eat their favorite meals on the rocks. They find clams, mussels and oysters and fly high above the rocks. Once they are elevated right above the rocks, they drop them and break them and eat the insides of the mollusks. Occasionally, the seagulls eat fish. Inside the tide lines there are several patches of marsh grass growing little by little, and catching the nutrients from the water and the particles of organic matter brought in by the river and the tides. The roots of this grass catch the soils and sands and build from these sediments more marshland. ⁶

Continuing down the river, this first rocky section of Kelsey Island ends into a flat and smooth salt marsh grass, extending to the south and to the west, in some areas about a meter high from its roots. This is the typical environment that is fed by the tides and that harbors innumerable kinds of animals and plants. Flats, grasses, tidal pools, and seaweed interplay in complex relationships. In this area one could actually see how the vegetation protects the soil and how it grows with it. We have a high marsh, a low marsh and some tidal flats. This environment is the home to a myriad of plants and animals. This marsh extends itself into the mainland, bordering by the river up stream to points where the phragmites take over the land. It also indicates how marshland was formed thousands of years ago. We must remember that the shoreline was about 80 to 110 kilometers to the south of Long Island. The sea level was 91 meters lower than it is today when the Wisconsin glacier was at its maximum. ⁷ This area of marshland is about 600 meters by 400 meters.

To the east and south west of this marsh we find the other two rocky bodies that make up the rest of the island. In between these rocky bodies, and facing south, we find some sandy beautiful beaches. These last places have cottages, and here people could actually come to the island to visit. There are tall trees, vegetation, and clearings with grass where people could rest and picnic.

Big boulders surround the beaches and the two large rocky bodies of land. These rocks are very large promontories scraped clear by the last glaciation. They are solid rock, quartz of the Stony Creek type. ⁸ These large rocky bodies extend themselves all around the island with some enclaves. The enclaves are the beaches and the grassy wet lands. At high tide some of these rocky bodies disappear underwater, creating little rocky islands to the south. These are called Darrow Rocks. Further east is Old Clump—another rock coming out of the sea. There are some other small rocky points on the east and center part of the island facing the Sound. They appear and disappear with the tides. When the tide is low, many small pools are left behind in the middle

of the rocks. In order to appreciate all these features of the island it is necessary to have a map of it. We are going to make our own map with the students. Students have been recording information for this map. As they draw the natural features of the island, they also record the numerical information with commentaries and annotations of the habitat, including the type of terrain it is that they are measuring and the flora and fauna present in each particular area. These exercises give students the opportunity to develop confidence and knowledge. The idea of having nature as a text becomes evident in this type of practice. Further, students who have the opportunity to participate, we are sure, extend this type of investigative attitude to any other type of situation, making the environment a theme for their observations, and nature, in general, a grand text to admire and relish. ⁹

The map

A map is a wonderful tool for understanding. Students have a passive attitude about texts in general. A map is a text. It is a particular type of text. It is a specialized kind of text. A map has words as well as numbers; a map displays drawings as well as colors and shapes. Students have a passive attitude about maps. They see them. They think about them and receive the information in a passive way. They have not developed an active and critical attitude about these tools. There are many different kinds of maps. We are interested in constructing a map with the students themselves; a map that will clarify the dynamics of a changing environment on the shoreline of the island. This map will illustrate all the relevant features already underlined above. By constructing this map students will develop a critical attitude about these tools of learning and informing.

A map is also a way to tell a story. To tell a story is an active act. The storyteller has to get involved with his/her audience. The storyteller has to address the audience in a way that the interest built in it will capture the imagination of the audience. When a student is able to gather the skills to build a map this particular student is engaging in an active act. The passivity is gone and the critical thinking begins.

A map of this nature includes the history of the island, the geological and natural history as well as the human aspect. History focuses on the changing environment of the island. It talks and illustrates the past of the island. It shows what was before, in a way that will leave clues for understanding the future of the island. The climatology and oceanography of the island will help to develop a basis for the history of environmental changes of the shoreline. Students of several grades—first to seventh grades—have already begun to develop this map. We are using the pace and compass method.

Life

This is an uninhabited island basis with no running water or electricity. Speaking with the Kelsey family about the history of the island, they told me that before the hurricane of 1938, all you could see from the western part of the island was a field without trees. The island was used for agricultural purposes. After the hurricane of 38, trees started to grow because there was no more agriculture. We could safely date the trees of the island to 1938 and its hurricane.

Life is abundant in the island. Perhaps it is not as it was a century ago because of the pollution of the waters of the Sound and the changing environment. Birds come from the north and south, the east and the west. There are several kinds of birds visiting and living in the island: ducks, swans, terns, ospreys, hawks, owls, great egrets, geese, seagulls, carpenters, sparrows, starlings, blue jays, robins and morning doves are the most notable ones. Some stay all year around. Others come and go with the seasons. The ospreys do not stay around all year long. They go away at the end of the summer. They come back in the spring, around April.

They come attracted by a couple of man-made platforms that invite them to a tranquil and protected environment, allowing them to reproduce and flourish slowly, but surely. The island is a bird sanctuary. All birds are protected in its grounds, although I hear that the reason for closing the island during the wintertime is because people go hunting ducks in there. During a very cold winter, rodents invade the few cottages on the island, attracted by the protection and the relative warmth inside the cabins. Once inside the cabins, the small field mice eat paper, containers and food if found, and help themselves to any clothes that would render them safety and comfort. This does not happen in a warm winter like the one in 1997. It seems that they prefer to stay outside in the fields. It doesn't happen in the summer either. In the winters of 1994, 1995 and 1996 mice were very abundant and healthy inside the cabins. They fed on plastic, paper and wood. In the summer time, these same little animals that managed to survive during the inclement winter, served as the main course of the birds, particularly the dinner of hawks. Fish is the favorite food of ospreys. ¹⁰ Since there is very little fish to catch around the island, it seems that the ospreys might be complementing their diets with these rodents. Crickets seem to suffer the same fate. Abundant in the summer, they fizzle out in the fall and disappear all together in the winter, to appear again in the early summer nights. Some of the smaller birds nest inside some of the cottages in the winter. There are still some that want to do it in the summer. As a matter of fact, the first visit of the year, around April or May, we always find birds flying inside the largest cottage. We open the doors and the windows and let them find a way out of their frantic and excited reaction. In a couple of field trips that we took with some students of several grade levels of the public schools of New Haven, we were able to note some of these cycles of nature. Students took notes, made drawings and walked around the western part of the island mesmerized by the peace and quiet of the place.

"No water, no electricity, no toilets and no cars—How could this be?" Commented one of the mesmerized youngsters. "There is electricity in the houses across the river; there are cars in the garage of the apartment building at Mansfield Place, we could even hear them—How could this happen?" Protested in an ironic tone another of the fellow companions.

"What do you do when you have to go to the bathroom, Mister?" Pointed another student of the sixth grade of Troop Middle School, with a sense of embarrassment and urgency.

"I need to go to the bathroom—"

We were at the western end of the island, in a small open field, at the center of four of the eight cottages in that area. We walked together to one side of the field where there is a well. I pointed to them that going to the bathroom out in the field probably has created problems in the water because a test proved the water of the well to be contaminated and dangerous if used. The feces of animals or humans probably contaminated the underground water in that side of the island with bacteria. We don't know exactly how it happened. The water looks, fresh, clean and colorless. People who don't know about it might easily make a mistake.

Some time back, it seems that at the turn of the century, there was a cattle business in the island. The cattle crossed from the main land by the gut on the north at low tide. At present, it seems to be very difficult to cross that part of the river walking from the north. There are sharp rocks in the water and the water level is high, perhaps 2 to 8 feet at low tide. The bottom of the passage is a thick mud also, making the crossing a sticky business. There was a Japanese cowboy who ran the business. We'll have to find texts to corroborate the story. These are all oral traditions told by people who have lived in the area for generations. Next to where the well stands now, there was a house, the foundations of such does not exist anymore. This house has disappeared. Again, some people say that the reason for the last people to leave the island was because one of the children died there. I think that one of the children drowned. Not too long ago, about twenty years ago

there was a camp in the western part of the island. Children came for part of the summer to do all kinds of water activities in the camp. An inscription on one of the rocks reads: "Camp Erick." At that time there was electricity in this part of the island. I recall four years ago taking some all wires out of the island.

We think that perhaps during this time the well of the water got contaminated. Then, again we don't know for sure. We took the student to the bathroom. What we do now is to take a couple of portable toilets into the island every time there are people there. These are light and fairly easy to handle. Under the circumstances it is the best we could do. Once the initial shock is over people do fine.

After a heavy rain in the island, we go for walks on the beach to see whether we could find some arrowheads. We have already found some of them. Other people on the other side of the island have a collection of these artifacts gathered after storms or heavy rains year after year. We don't know whether people actually lived in the island before the European came to these lands. We know that they were here all the time because of the arrowheads and a small archeological site that has not been explored completely. People who frequent the island and who have lived most of their lives around in the area love to sit and talk about it. Every year during the summer, after the Fourth of July, all the people that have cottages in the island gather together to share food, drinks, and most especial of all, to talk and share stories about this wonderful place in the Sound. The information that we share here in this unit is taken from books, maps, articles of magazines, videotapes, personal observations and those of students of the New Haven Public School System and other systems in the area who came at one time or other, and from these stories.

Branford used to be called before the European occupation, Totokitt or Totokett, which means "the land of the tidal river."¹¹ It is interesting to note that the state of Connecticut got its name from the Native American word, 'quinnehtukqut,' which means beside the long river."¹² Mixashawn, a Maheekanew (Mohegan) Native of the Connecticut River Valley, calls it Qwannitucket. Branford, the township where Kelsey Island is located, came to be known because of the Pequot War in 1637. Soon after, in 1638, the New Haven Colony took steps to acquire this region claimed by the Matabesecks. At this time the native ruler was Montowese, "son of the Sachem Sowheog, who had his headquarters in Middletown."¹³ According to Carr, the price was "11 coats of trucking cloth and one coat of English cloth, made of the English fashion."¹⁴ Later on, six years later, Totokett "was offered to the dissident members of the Wethersfield church, who repaid New Haven the purchase price, said to be "betwixt 12 and 13 pounds."¹⁵

Those times are long gone. The wealth of life of the time cannot be recuperated completely. This is part of a global change that came with European incursion in the land and the subsequent industrial revolution and the changes in life styles of the people around the Sound and the world. The salmon is gone, the whales are gone and the seals are gone too. In spite of this, much of the life still remains and seems that the consciousness of the people of the land will help to bring as much of it back little by little.

Most of the year this island is visited very seldom. In the Summer time people come to its beaches to take advantage of the peaceful environment, the relatively clean beaches, the sun and the sands. Visitors don't come inland since this is private property. They stay at the edge of the high tide line. There are a few people who rent some small cottages in the island. In the western part of the island there are four families. In the East there are a few more, including the owners of the property, the Kelsey family. The families in the West have access to the island from March to November, but they actually go there during the summer months. Winter is too inclement to make the island a place to visit and rest. It is beautiful and clean nonetheless. The lack of water, electricity and modern facilities makes it a cold place to visit. People, who go to the island in the summer with their boats, clear the island by five or six o'clock in the afternoon. Then, the island is quiet, calm,

deserted in a way. Across the river life goes on. As the evening comes in, the electric lights of the houses across the river begin to light up, leaving the island behind in darkness, little by little as the sun disappears. At night, the birds, big and small, go to sleep, and all that one could hear is the pounding of the waves against the rocks, the wind flowing in the trees and the shrubs and once in a while the cry of a local owl perching in darkness. An occasional bat flies curiously over the breeze. This is the general atmosphere and social environment of the island.

Students conducted an experiment about the habits of the people who come to the island to spend the day with their boats. They wanted to know what they did with their garbage. For this we decided to collect garbage for five weeks at Horseshoe Beach. They also wanted to compare this garbage with the garbage of an old site at the edge of the marsh. Their hypothesis was that people throw more garbage now than before. After collecting garbage from both sites, and analyzing the findings their data they came to realize some interesting conclusions. They picked two garbage bags the first week. The second week they picked one and one half. The third week they picked one bag. The fourth week they picked one half bag and the same the last week. The content of the garbage was mostly plastics, ropes, bottles, caps, bags, containers and many cigarette butts. They also found beer bottles and cans. Most of the garbage seemed to be from the tides. Except for the cigarette butts and cans of beer, the rest of the garbage came from the outside. The garbage that was picked at the edge of the marshland had no plastics. All that was in there was rusting metal and old bottles. This garbage was from the island, but it seems to be from the time before people used plastics extensively. Students could not begin to take the garbage that was buried at the marsh. Their conclusions were that people who drink and smoke have the tendency to pollute the environment. Sometime back, before plastics, people just threw garbage away. Also the tides bring materials from the outside world. Inland, the marsh suffers from pollution. We plan to continue our investigation.

Another experiment that we did since April had to do with the results of seawater on the bottom of the canoe. We wanted to find out what would happen if we left an aluminum canoe in the water for a few months. Students came periodically to check on the bottom of the canoe. The first couple of weeks nothing happened. Then on the third week they noticed that a film of matter had developed at the bottom of the canoe. In June the film had evolved into an intricate network of living organisms: mussels, clams, steamers, sponges, sea grapes, shrimp and tiny algae were covering the surface of the bottom of the canoe.

We looked under the microscope and we could see the thriving energy of the seawater. The cells of the algae were full of small life wiggling and turning in all directions. They concluded that the water was alive. They realized that the cycle of life could start in unexpected ways.

In this way we also realized that that the chain of life goes into Long Island Sound and from there into other oceans. This interconnection is observable in the past as well. We know that Long Island Sound was a lake in the past. Seven thousand years back this lake turned into a salty body open to the ocean, different than that fresh water lake fed by the glaciers. The raising of the sea levels affected other parts of the world also. The Black Sea was a fresh water lake seven thousand years back. ¹⁶ Since these times the waters of the oceans have been going up. The plate tectonics that formed the Appalachian Mountains millions of years ago gave also the base for the formation of the Sound and Kelsey Island. The interconnection of the world is ever there. When was Kelsey Island formed? Students are fascinated by these questions. Answers to these questions are the flesh and bone of our investigation. We hope that this study and methodology creates more awareness of the environment. Students also become aware of the joys and fun of studying science.

Lesson One

The effect of the last Ice Age on land

In this lesson the objectives are to have students understand the effects of the ice on the land as it passed down south crushing and grinding every natural feature on its way. In the Connecticut shore, and particularly at Kelsey Island, since this is the place of our study, the last glaciation left behind the bare rock of the type of the Stony Creek Granite. The sands and the pebbles on its beaches attest to the common debris left behind by these huge bodies of ice as they moved and finally melted.

Materials

A large solid block of ice

Rope

Sand

Gravel and rocks

Procedure

Tie the rope around the block of ice. Place the block on the sand, or ground. Place some gravel and rocks in front of the block of ice and drag it for about five feet. Measure the results. Follow this procedure one more time, but this time drag it for about ten feet; then do it for twenty feet. Each time measure the results and compare and contrast.

Did you find any similarities between your results and the passage of ice south from the North Pole in the last Ice Age? Explain your results in writing and illustrations. How could you device this experiment in a better way?

Lesson Two

The increase of the volume of the oceans; the sea level raises.

Global change could be best understood by visualizing the level of water going up all around the island. Let's just picture what would happen if we visualize one foot of water above the present sea level at high tide. In my mind the water would cover all the wetlands and grasses of the island. That situation will cover more than 50% of the land, and area of the island. Whatever was left behind after the sea level went up would be something like three or four very small islands with some grass sticking out of the surface of the water. There would be many rocks sticking out of the water. What do you think would happen if two or three feet of water went up?

During the last Ice Age miles and miles of ice covered the surface of the land covering New England all the way to the middle of Long Island and stretching as far as the Ohio and Missouri Rivers. This happened all around the globe. The ice that built up for thousands of years eventually went away by melting and leaving

behind debris brought from the north. This cold fresh water turned into lakes and rivers that eventually gave the characteristics of the land today. The level of the oceans in the world went up.

We are going to recreate some of the effects of the melting of the ice. We are going to measure the level of the water before and after the ice melts.

Materials

Ice cubes or an ice block

A container large enough to hold a block of ice or many ice cubes.

A ruler

A heat lamp (to speed up the process)

Procedure

Place some water in the container. Measure the level of the water. After this, place the ice in the container until it melts. Measure the level of the water now. How do you think this compares to sea level going up after the last ice age?

Lesson Three

What is under the boat? What is under the microscope?

Students are going to study the effects of water of an estuary on the bottom of a boat. The water in an estuary is moving all the time. First it is moving because of the tides. Then, it is also moving because of the river flow coming from the interior of the land. This water has a mixture of salt water and soft water. This creates a very special environment for opportunities for growth of plants and animals—flora and fauna.

Generally, the water of an estuary is murky. There are many life forms thriving in it. We want to know what would happen to the bottom of the canoe if we leave the canoe in the water for a few weeks.

Materials

Canoe

Microscope

Paper and pen

Procedure

Leave the canoe in the water for a few weeks. Every week go and check the bottom of the canoe to see what happens. If you find any change at the bottom of the canoe draw it and write about it. After this first exploration and observation, scrape off some of the matter, if any, and place it under the microscope. What do you see? Draw it and write about your findings. Make comparisons between the data obtained in the very first observations and data that you got under the microscope.

What do you think happened here?

Research more information about what you have found during this experiment by the shoreline.

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Field Trips

There are several locations in the area with abundant information for students about the environment of Long Island Sound.

The Whitney Water Center

West Haven Beach Bird Sanctuary

Connecticut Audubon Coastal Center at Milford Point

The Light House Park in New Haven

The Mystic Seaquarium

Norwalk Marine Center

The Peabody Museum

The Shore Line Trolley Museum in Branford

The Timble Islands in Branford at Stony Creek

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