JoAnn Thissen
Nassau Community College

One of the best ways to promote earth science literacy is to immerse students in their learning, to put them in situations where they must learn, not just the concepts, but also the language of science and the process of science. I teach two standard lecture/lab courses and one field course. None of these courses have prerequisites but students have previous learning as part of their Earth Science Regents level courses taught in New York State junior or senior high schools. When they come into my classes they have already been exposed to the language of science but have no real idea what it really means. They just wanted to pass the Regents exam so they could graduate. Now they're challenged to use this previous learning to apply it and become active participants in their learning. Now they are challenged to *see* the world they live in.

Our school has an extremely diverse student population of about 22,000. These are students who leave their homes, drive their cars to school, go into the building, drive to work, drive home, etc. They never really look at their environment, it's just something they have to pass through on their way to ….someplace. Just the words "hands-on, real life earth science" may as well be spoken in Martian for all it means to them. My goal is to introduce them to their world – to get them to *see* their world differently. I face the challenge with confidence in my students and a high degree of enthusiasm for my subject.

My Field and Laboratory Geology course is offered during the summer intersession for ten straight days starting the day after spring term ends through Memorial Day. This course is a total immersion course. We spend every day in the field. We use the tools and technologies used by professional geoscientists. We collect samples and bring them back to the lab for analysis.

We are lucky enough to live in an area with amazingly diverse geology. We live on an island created by continental glaciation. The terminal moraines form the backbone of the island, school sits on the outwash plain and of course, we have a system barrier beaches. We are very close to New York City with its complex metamorphism and not very far from New Jersey and Connecticut's Mesozoic Rift Basins with their lava flows and dinosaur tracks. Plus- they've all driven over the George Washington Bridge crossing the Hudson River Estuary and coming face to face with the Palisades Sill. The field course takes advantage of opportunities presented by the local geology.

The first half of this course is a study of Long Island geology. Students do a study on Point Lookout, a local beach on one of our south shore barrier islands that has been badly affected by erosion. They study the affect of jetties, measure and profile the beach and collect sediment samples that they take back to the lab for course-grain analysis. The study incorporates a statistical component as well as the use of specialized computer programming and spreadsheets for analysis and graphing. The residents of the village of Point Lookout come out every year and talk to the students about how their research is helping the residents understand their beach. This validates their work and puts it into the category of real life and not just an esoteric school assignment.

We then visit Caumsett State Park, north shore beach that is glacially controlled sitting at the northward base of the Harbor Hills moraine. They do an in-depth study of the complexity of the moraine, measure the beach and collect samples there to compare them

to the south shore beach sediments. This leads them into a study of sediment textural maturity. They also compare the effect of erosion on a different type of shoreline within a totally different environment.

The second half of the course focuses on the NYC Metro area geology. We start by studying the bedrock that forms the basement rock of Long Island and upon which all the sediments that make up the island sit. Here they can map the glacial striations left as the ice sheet moved over the bedrock. We visit several sites around the five boroughs making a simplified geologic map of the area with its complex formations. They go from NYC across the Hudson to see the Palisades Sill up close studying it from its base to its top. They are amazed when they also see glacial striations on the top of a sill that was formed deep underground at a time when dinosaurs roamed the area. We follow the igneous formations in the Mesozoic rift basin of the Newark Basin in New Jersey, visit a retired zinc mine that tunnels through 1.3 billion year old Franklin Marble and finish the course by walking in the footsteps of dinosaurs in the Mesozoic rift basin of the Connecticut River valley. At Dinosaur State Park they conduct a study of dinosaur tracks measuring foot length, stride length using this information to mathematically calculate the hip height of the animal and to determine whether it was walking, trotting or running. They also examine the ripple marks, drag marks and other environmental indicators to determine paleoenvironment at the time the dinosaurs roamed this place.

My fall/spring lecture/lab Physical Geology course continues the study of Point Lookout and Long Island geology giving us an in-depth multi-year study. Because the NYC metro area sites are not easily accessible during the regular term my Historical Geology class projects vary from year to year. This year, fall and spring, students drew cards out of a "hat". Each card represented a geologic time period. They were then "hired" as the head of marketing for an ecotourism company. Their job is to create a brochure of their time period from the point of view of it being the PERFECT vacation. They are told to "think 'Jurassic Park' not Great Adventure" and are told "In lieu of payment you will be given points towards a grade in a 4 credit lab science course. These credits will be applied towards your next pay raise. The better your grade, the bigger your raise." But it's not as simple as that. They are given weekly assignments to write two page papers on the geology, oceans and atmosphere, flora and fauna of their time period. These scientific facts must be included in their brochure. They must choose a "theme" and must include the science. Otherwise they are free to be as creative as they want. At the end of the term they must all present to the class and act as "salespeople" to "sell" their location. This project incorporates scientific research with computer skills.

I am also the founding faculty advisor to the Earth Science Club. We have speakers from many disciplines of geoscience, researchers, graduate students, local community leaders and Nassau Community College students who have done internships present to the club. We also go on field trips and local geoscience meetings.

Every term I hear several students tell me that they have become inspired to go on as either Geology majors or Earth Science Education majors – a career they never thought to pursue before they took one – or all – of my geoscience courses. My institution does not have a Geoscience major or a Physical Science major (Geology is taught in the Physical Sciences Dept) but my school does have an education major for which I serve as an advisor. Because we've had an increase in students interested in pursuing a career in the

earth sciences, I am presently working on creating a major in Geoscience that will have a Geoscience Education component.