

SEA ME Do Science by Megan McLain

How can you get students to live and love “science as a way of thinking”? Students from the International School of Estonia and the Tanum School in Sweden teamed up to investigate marine ecosystems in the Swedish fjords for three days this October. The schools attended the SEA ME (Science Education Applied through Marine Ecology) field trip sponsored and organized by the University of Gothenburg at their research facilities in Tjarno. The focus of the trip was to have students design, carry out, and present scientific investigations. The staff at Sea Me provided foundational support and helped guide the students with questions, encouraging them to think through each step of the process.

Day one began with a cruise on the University’s research vessel. From the vessel, the students, with the help of the SEA ME coordinators, sampled organisms from the sea floor, deep in the fjord. Students sorted through the muck to discover a variety of creatures, from sea-squirts to sea stars; they even found and tried a seaweed that tasted like “old bacon”. To collect organisms from the shallow water, the students pulled on waders and scavenged with nets and buckets. The organisms were brought back to the university lab and sorted in the tanks.

That evening, the students attended a lecture on natural selection, and then headed back to the lab to work in mixed groups to compose research questions. They thought through the biotic and abiotic factors that could drive speciation while they observed the organisms and researched information about them in books and on the internet. Each group created a long list of options of what they might investigate and eventually narrowed down those ideas by thinking through the logistics of a sound scientific study. Some groups decided to rule out studying certain species because the sample sizes were too small, others because they were too sensitive to human observation. By the end of the first day the students had decided on a hypothesis, null hypothesis, and explanation for their predictions.

The focus of the second day was designing and carrying out controlled research investigations. Teachers and University staff helped students think of variables that might need to be controlled. Groups continued to rework their designs, at times starting over until they were satisfied they were only testing the independent variable. Using some very creative set-ups, the students carefully observed and collected data on their experiments. The hypotheses they tested ranged from food preferences of starfish, to shell choices of hermit crabs.

On the final day, students evaluated their investigations and analyzed their results. For the grand finale, groups presented their findings to a panel of university professors and graduate students. After three solid days of scientific thinking, the students skillfully defended their research designs and the significance of their results. One IB diploma student even found inspiration for their extended essay topic. This was a truly worthwhile hands-on opportunity for students to practice the scientific method and prepare them for future investigations.