

Case Study: Go Fish

There's something fishy in the state of New York. But in this case, it's all for the good. In bucolic Binghamton, trout streams abound. Their "residents" are accurate gauges of the local water quality and the health of the environment: trout cannot survive in water that is too warm, too polluted, or that contains high levels of certain dissolved solutes. Soon, supported by [Vernier's LabPro](#) water quality probes, students in eleven school districts will be studying the fish to learn important lessons about watersheds and the world's dwindling resources.

This innovative educational model, dubbed "Trout in the Classroom," is a cooperative effort between New York's Harpursville School District, the [Broome-Tioga Board of Cooperative Educational services \(BOCES\)](#), and the Al Hazzard chapter of Trout Unlimited. How did the three groups come to collaborate? The credit goes to Will Brigham, an educational technologist with BOCES and a former teacher.

Brigham is charged with promoting the effective use of technology in the schools served by his BOCES. Chatting with a colleague (a major fishing enthusiast) one day, Brigham had an epiphany.

"I'm always looking for engaging ways to encourage teachers to use technology," Brigham explains. "My colleague, who belongs to Trout Unlimited, was talking about how the organization wanted to get involved in local and national education. I said 'what if we could actually put trout into an aquarium, and let our students study them?' Then, using software and hardware tools like the Vernier products, the kids would be able to collect the data, analyze it, and convey their findings. We both got pretty excited about the idea."

In almost no time, Brigham requested his first supply of trout eggs from the New York Department of Conservation. He deposited these into the aquarium housed at the BOCES office, while his friends at Trout Unlimited came through with the chilling mechanism needed to maintain the frigid waters trout favor. Soon enough, Brigham and company had a tank-full of new fish swimming happily about.

Says Brigham, "That was when we realized we had a viable model. From my past job as a teacher I knew about the [Vernier probes](#). I felt sure the company could help us come up with a way to measure water quality that would be both informative as well as fun for our students."

Brigham next worked with a grants writer to secure funding for the project. As luck would have it, said writer was also a fishing fan. Accordingly, their impassioned proposal (which they called "Go Fish") earned a \$50,000 grant to launch the program in the eleven school districts.

The funds now enable the districts to send two-teacher teams through four days of staff development. In addition, each of the teams will take home a 55-gallon aquarium, stand, and filter, as well as a Dell laptop loaded with the Microsoft Office Suite. Rounding out the bundles will be the [LabPro Water Quality Package](#), which includes sensors, electrodes, a 4-wavelength colorimeter, and the LabPro handheld interface.

By the start of the 2004 school year, all of the teacher teams will complete their training on the new technology tools. At "Camp WYSIWYG," a series of staff development sessions staged each summer by Brigham and his team, teachers from the local districts will learn to connect the Vernier probes to their laptops to monitor dissolved oxygen, pH levels, turbidity of the waters, nitrate and nitrite concentration, ammonia levels, and more.

Next, the educators will use the data they collect to populate Excel spreadsheets, creating colorful charts and graphs to track the changes in water conditions and quality over time. Subsequently, the data will enable teachers (and later, their students) to observe how conditions in an aquarium differ from

those in streams, what the implications might be for the fish, and so on.

"We're striving to provide students with an opportunity to gather data on those fresh-water indices most critical for trout survival," notes Brigham. "The students will be using Vernier probes in the aquarium water, where the trout will hatch and grow. Afterwards, they'll compare the tank water with local stream samples. During the course of the next school year each district will then forward their best lessons with supporting documentation to us, so we can share all of the findings."

Brigham says the upcoming staff development sessions will give Binghamton teachers the chance to maximize the value of the Vernier products. "Several of the schools had purchased the probes in the past, and wanted to learn more about their capabilities," he says. "Having a trainer from Vernier on site during Camp WYSIWYG will be an enormous help to these teachers, as well as my group, as we can then assist all of the districts that are considering purchasing the probes.

"The feedback from the teachers is that Vernier makes just wonderful technology, and they really want to learn to use it as effectively as possible," Brigham adds. "Being able to take the data and put it into a spreadsheet to produce charts and graphs really helps students 'see' the information. Plus, the Vernier probes give students limitless opportunities to explore, then they can access data that will provide substance to back up their hypotheses."

When school commences in the fall of 2004, the young scientists and their teachers will begin "Trout in the Classroom." Brigham points out that without the support of the local community, the effort would...well, dry up. His friends at the local chapter of Trout Unlimited, who have already contributed three aquarium chillers to the cause, will provide all trout eggs and food for the fish. Additionally, the organization will intercede on the districts' behalf with the state Department of Conservation for release permits. This will become critical at the conclusion of the school year, when students will release their aquarium-bred trout into the wild.

"Without a doubt, Vernier has been central to the success of this whole effort."

At the start of the 2005 school term, a new delivery of eggs will begin the process anew. If all goes well, Binghamton will be touting its trout for years to come.

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