



THE REEF & MARINE AQUARIUM MAGAZINE

REEF



Tangs

- Breeding *Apogon* Cardinals
- Classroom Reef Tanks
- Aquarium Sustainability?

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The Classroom

Reefkeepers
help get aquariums
into schools

Ocean

A large, rectangular soft-coral tank is the central focus of the image. Inside the tank, there are several large, pinkish-purple soft corals and a few small, colorful fish, including a bright blue tang and a yellow tang. The tank is situated in a school library, with an American flag visible in the background and a student sitting on the left side of the frame. The student is wearing a blue t-shirt with the word 'believe' on it. The tank is made of clear glass and has a black frame. The lighting is warm and indoor, typical of a school library.

It is a late March, end-of-winter day. A cold wind is blowing through the brown, dead hills. Walking from my car toward the red institutional brick of Williamsport (PA) High School, I must negotiate piles of snow plowed up around the edges of the parking lot. The sky is low, overcast, and gray. Winter in the Northeast has dragged on this year. It seems about as far as one can get from the warm, turquoise waters of the South Pacific.

As I step through the doors of the school's science wing, the biting outdoor chill fades away and winter disappears. I can almost hear a southern breeze whispering through palm fronds and the soft crash of waves on a tropical shoreline. I am taken back to days spent in warmer climes, snorkeling along a fringing reef. Here in the hallways of this high school there are tangs: Hippo, Yellow, Vlamingi, Powder Blue, and Sail-fin grazing over coral heads defended by turquoise damselfishes. Banggai Cardinals hover above flowing fields of grasping, pulsing *Xenia*.

Student helpers at Williamsport Area High School. Left to right: Nick Pompeo, Tom Osborne, Divia Feinstein, and Kaley Brinkerhoff take a moment to enjoy the 125-gallon (473-L) soft-coral tank in the school's library.

Pairs of orange and white clownfish nestle among the magenta tentacles of anemones. A small Picasso Trigger lazily chases a Flame Angel around an enormous leather coral. There are tall spirals of plating *Montipora*, huge jumbled fingers of red and green *Acropora*, and pink Birdsnest and Green Frogspawn Coral colonies the size of soccer balls. *Palythoa*s, zoanthids, and mushrooms blanket areas not colonized by stony species. Yes, there are reefs in this high school and it is clear from the colors, sizes, and variety of the corals and fishes, not to mention the number of tanks, that they are part of a complex and amazing system.

This oasis of salt water, light, and aquatic life is the brainchild of physics teacher Lawrence Flint. Started seven years ago, the school's main aquarium system now exceeds 2,000 gallons (7,570 L). Flint, with considerable help from a local reef aquarium club, supports and sponsors tanks for educational purposes in 11 other schools and institutions.

The tanks at Williamsport occupy the four window spaces looking into what was once the school's vivarium. The trees and plants that provided a hint of green to the school's brick hallways are long gone. They have been replaced with a miniature ocean. Sitting behind safety-glass viewing panels are three reef tanks, all part of the same connected system, and a fourth tank is in the process of being added. Nearly 2,000 students, faculty, and assorted visitors will walk past these aquariums on any given school day.

The fourth window is filled by an empty fiberglass and polycarbonate monstrosity. This will be the latest addition to the system: a 670-gallon (2,540-L) reef. Flint was looking for something to add punch to the already impressive display, and eBay came through. This fiberglass giant was purchased from a dive shop in the southern part of the state that recently went out of business. Flint believes it was never used. That will definitely change here. His students have added a 4-inch (10-cm) thick viewing panel and plumbed it into the rest of the reef system.

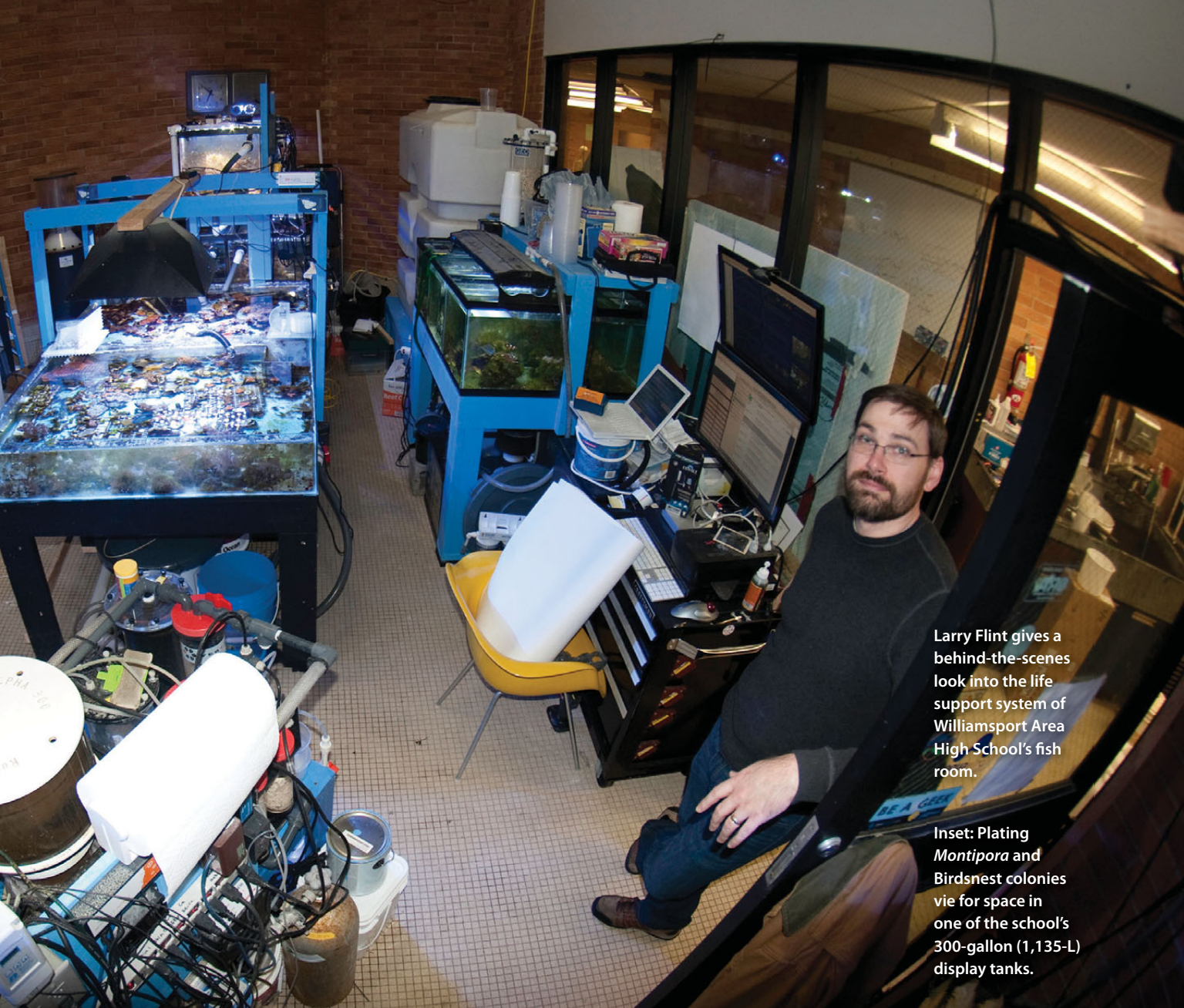
Beside the fiberglass behemoth sits one of two 300-gallon (1,135-L) displays. The aquascape is loaded with large Frogspawn, *Montipora capricornis*, and assorted SPS coral colonies growing on a shallow reef slope. There is a lot of room for the tank's group of blue Hippo Tangs and other fish species to swim in.

Between these two 300-gallon aquariums is the tank



that started it all. Seven years ago Flint was raising African Cichlids in an aquarium at the school. One day he received a call asking if he would be interested in a complete 125-gallon (473-L) saltwater system. It had been abandoned at a local trailer park

when its owner left without paying rent. The landlord knew that Flint had a saltwater setup at home, and added that if he didn't want it, the tank and its inhabitants would be dumped the next day. Unsurprisingly, Flint said yes. The tank is now a jam-packed soft-coral tank loaded with *Anthelia* and leather corals that flank two spiraling



Larry Flint gives a behind-the-scenes look into the life support system of Williamsport Area High School's fish room.

Inset: Plating *Montipora* and Birdsnest colonies vie for space in one of the school's 300-gallon (1,135-L) display tanks.

colonies of plating *Montipora*.

On its other side sits the second tank added to the system, a 300-gallon tank that the Williamsport High class of 2010 donated to the program in keeping with the theme of their senior prom—Under the Sea. The gift came with a condition: the tank had to be moved, with all its inhabitants, to the site of the prom on a Thursday and back to the school on a Sunday. Since then, the tank has filled in nicely. It is loaded with SPS and fishes. Several of the colonies have grown from small frags, donated by hobbyists, to the size of basketballs. Some of the corals have matured to the point that they stretch out of the water.

There are additional tanks throughout the school—a 125-gallon soft-coral tank in the library, a tank in the attendance office, and a 55-gallon (208-L) clownfish breeding display built from scratch by students on the other side of the biology hallway.

FISH TANKS IN THE CLASSROOM

Flint is not only a physics and chemistry teacher at Williamsport High School; he is also the Vice President of Education for the Reef Conservation Society (RCS), a nonprofit reef club and conservation organization in Pennsylvania. The school's system is run entirely on donations from the RCS and its members, corporate sponsorships, and sales of coral at RCS frag swaps (one of which is hosted at the high school annually). The club has supported the Williamsport school tank since the mid-2000s. In recent years the club has reoriented itself, morphing from a group of hobbyists who swapped coral and knowledge into an organization focusing upon educating the public about reefs and working toward saving them. Flint and the club members believe that each piece of coral grown from a frag by hobbyists is one less piece that comes from a wild reef. They also believe that each person who is introduced to the complex beauty of

a coral reef ecosystem is one more person who will work toward saving our oceans.

"Reefs need rescuing," says Flint. "The hobby as a whole can help oceanographers and biologists understand what is necessary for corals to survive. As the oceans become more acidic because of rising carbon dioxide levels and both sea temperatures and sea levels rise, aquarists can raise awareness of the reefs' plight as well as provide places where coral can continue to grow and thrive."

Putting tanks in schools is a good way to teach about reefs, especially in an area where students have no other way of accessing the ocean. The aquariums along the science hallway are alive with color, motion, and the complexity of life on a coral reef, something you would have to travel a minimum of 1,300 miles (2,092 km) from Williamsport (to the Florida Keys) to experience in the wild. Students who are exposed to a captive reef are more likely to care about what happens to wild ones.

Aside from providing exposure to the beauty of the ocean, reef tanks are a great way to teach hands-on science through very visible interactions and relationships. Flint is very keen to talk about the educational benefits of keeping a tank in a school classroom. "Pennsylvania has recently adopted biology standards that must be taught throughout all public high schools in the state. These standards are assessed with a common Keystone Biology Exam at the end of each course. Because of the diversity in a reef ecosystem, every major learning objective can be taught through the use of a reef aquarium integrated into a class curriculum. Students can study the structure and function of all its inhabitants, the energy needs of different types of animals, life cycles, cellular and organism reproduction, and the interaction of species.

"It's pretty simple. We put reefs in schools so that students can learn about reefs. But the idea of taking a living organism off a wild reef seems counterproductive if you want to teach conservation and protection of natural resources." Flint says the club realized this early on. As the Tanks in Schools program grew, the club has worked

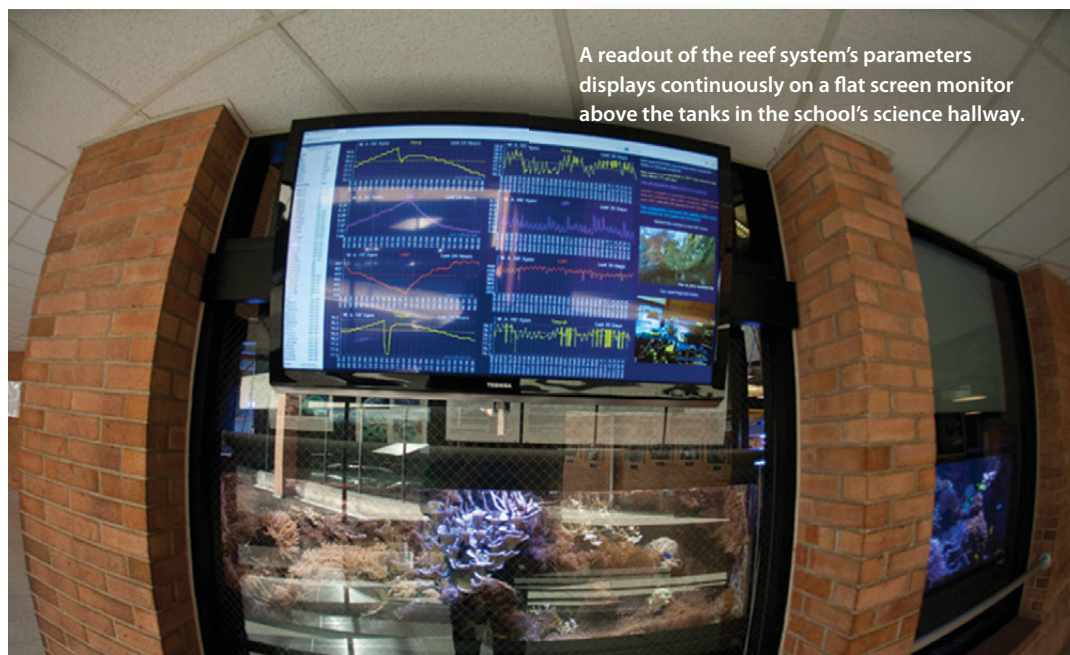
toward a point where removing rock or animals from the ocean to start an educational tank can be avoided.

Flint goes on, "The program we run is now able to create the biological parts of a school tank with no initial impact to the wild reefs. We use rock mined from ancient reefs in inland Florida. The rock gets seeded in our display systems at Williamsport for up to a year and delivered to the new tank, along with live sand and water, already cycled. All coral comes from our frag tanks, where it has been grown out from the donated pieces residing in the display tanks. Not only does starting a tank with seeded "dry" rock and coral cuttings allow us to do it for cheap, but it is also a great way to start each new tank project with an inherent message of conservation and sustainability. We have just started a clownfish and Banggai Cardinalfish breeding program here at the high school. Through donations by breeders within the club, we have been able to provide our school tanks with captive-bred clownfishes for several years. We are creating a teaching tool that has no initial impact on the wild reefs."

The Tanks in Schools program started because education and conservation are part of the club's bylaws. "Some clubs," Flint says with a laugh, "make a surplus and use it to take a snorkeling trip or something. We pump it back into education. It's possible because of the TFP (That Pet Place) swaps."

Here Flint is referring to the biannual frag swaps the Reef Conservation Club hosts at That Pet Place, a massive pet shop in Lancaster, PA. The swaps pull in hundreds of hobbyists and have become a huge event for the club as fundraisers for the Tanks in Schools program.

Clearly the school district is also supportive of the program; they donate the space and the utilities to the program. "That in itself," Flint points out, "is no small bit of help. We have received continuing support from the school district, the school board of directors, and the Williamsport School District Foundation, as well as the First Community Foundation Partnership of PA." Flint and the club have also been fortunate to develop rela-



A readout of the reef system's parameters displays continuously on a flat screen monitor above the tanks in the school's science hallway.





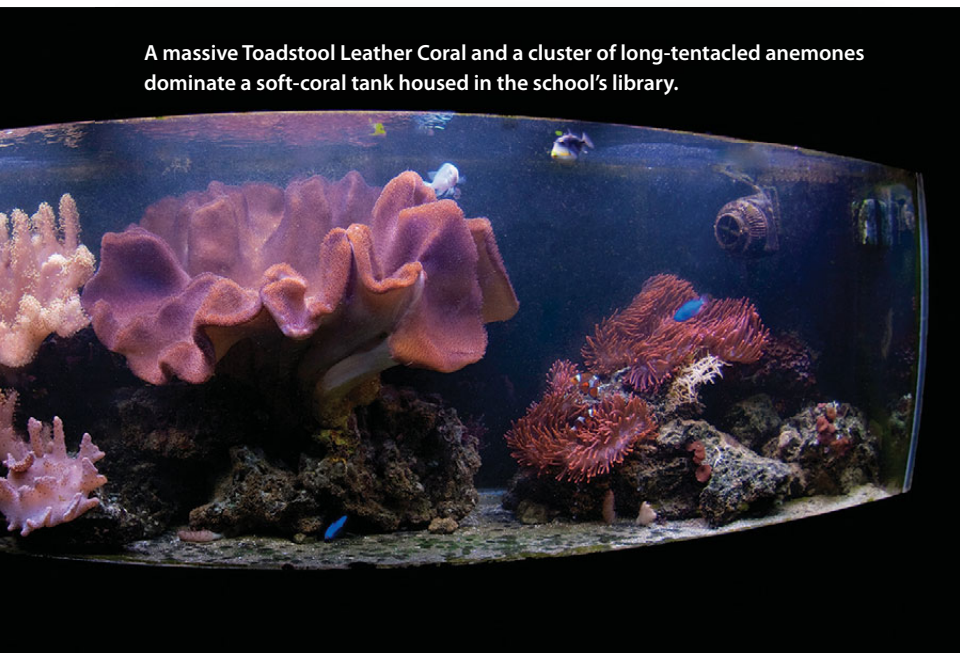
Students Tom Osborne and Nick Pompeo ready frags of grape *Montipora* in preparation for the April Reef Conservation Society Frag Swap held at Williamsport Area High School.

tionships with several stores and corporate groups that donate or discount supplies and services, such as AVAST Marine Works, Beyond the Reef, Rapid LED, Bulk Reef Supply, Reeflo, Neptune Systems, Knockout Aquatics, Vertex Aquaristix, That Pet Place, and Aqua C. United Pet Group /Marineland/Instant Ocean, makers of Reef Crystals, donate all the salt, not only for the tanks at Williamsport High School, but for all the other tanks in the club's program. Everything else comes from club

donations in the form of equipment, corals, and fishes, or from coral sales at area frag swaps. The money is then pumped right back into the program.

THE FISH ROOM

We walk through a classroom and into what looks like a small pet store. Racks of bits and pieces, stacked 5-gallon (19-L) buckets, and the odds and ends that accumulate around any growing aquarium system grace a storage room. But this isn't the fish room itself; that is even more impressive. Crammed in behind the display tanks are more tanks and the array of equipment needed to keep 2,000+ gallons of saltwater and its inhabitants healthy. A pair of 60-gallon (227-L) frag tanks, where the program grows corals to sell at swaps and populate new school tanks, sits in the room's center. Behind them are six 40-gallon (150-L) breeders set up to raise clownfishes and Banggai Cardinals. There is also a giant Rubbermaid sump and a huge bin used to clean live rock. PVC pipes snake across the floor, connecting all parts of the system with the



A massive Toadstool Leather Coral and a cluster of long-tentacled anemones dominate a soft-coral tank housed in the school's library.



Flint and his student helpers gather around one of the school's two frag grow-out tanks. L to R: Divia, Kaley, Larry, Tom, and Nick.

exception of three 40-gallon tanks used for quarantine. Flint has just added a new commercial skimmer, standing 6 feet (1.8 m) tall and rated for 2,500 gallons, and is working on dialing it in. Nearly every piece of equipment is run and monitored by an Apex controller. A constant readout of the system's parameters is displayed on a monitor by the door and mirrored on a flat screen above the display tanks in the hallway.

Overall it is an incredible setup, especially for a school in today's fiscal climate. I confess to Flint that I am slightly overwhelmed by it all. Does he manage the system all by himself? "No, I have a number of kids that help after school," Flint tells me, adding that I should come back in a few weeks on a day when his student helpers will be around.

THE SECOND VISIT

Two weeks later, on a much warmer spring day, I return to meet some of the students who help take care of the tanks. Once a week they stay after school to work on projects related to maintaining and growing a 2,000+ gallon system. I wonder if they know how lucky they are, being able to learn so much in a hands-on environment around a system of reef tanks that most hobbyists can only dream of.

Four students (Kaley, Divia, Tom, and Nick) are working in the fish room when I arrive, testing water parameters not measured by the system's probes or work-

ing at gluing cut pieces of purple *Montipora* to plugs and placing them into the frag tanks. Since my last visit, Flint has leak-tested the 670-gallon tank and braced it with a wooden frame. It has now been drained for aquascaping. Kaley and Divia are sitting in the bottom of the dry tank; Flint stands on a ladder and passes down pieces of live rock that they are epoxying into two large columns.

None of the students has a reef at home, though they profess that they want one eventually. Most have some sort of freshwater tank and one, Nick, has a koi pond. They had no experience with taking care of a system of this scale before becoming student helpers. Some helped take care of the tanks by participating in Flint's reef camp over the summer. Others signed up once Flint announced it during the physics class he teaches. They all acknowledge that Flint has a reputation for doing hands-on projects and that they wanted the chance to do something different in school.

"Mr. Flint is really big about hands-on," says Tom. "It's one of the reasons that I signed up to help out after school. We built everything for the clownfish tank in the hallway from scratch. He did not do anything except add a bit of paint to one part of the stand. We built the tank and the stand, and soldered the LEDs."

"We also put together the frag tanks," chimes in Nick. "He had us cut the glass out and silicone it together."

Aside from helping with the tank, students will also help when the school hosts the annual spring frag swap.

In January, Divia went to the club's big winter swap in Lancaster and helped Flint sell coral in deli cups. The kids know that the money they make goes into their school tanks or other tanks in the program.

None of them seems particularly interested in a career in biology, but they have latched onto the concept of how fragile the reef is. Divia sums it up: "It's good to grow stuff out in the tanks so people do not have to take it out of the ocean. If they want coral in their tanks they can just get it from us; it grows fast and by the next swap we have more. We also learned about the Banggai Cardinalfish and how they come from one group of islands. It's a big impact to take a lot of something from one area." She gestures toward the six 40-gallon breeding tanks. "We can try and grow them here; if we grow them on our own we don't need to take them anymore."


We head down the hall to the library. The students are eager to point out the 55-gallon clownfish tank that they built from scratch in an empty display case. They are quick to let me know that the clowns were captive-bred by someone in the club and the rock was seeded in the school display tanks. It is obvious that they are proud of what they have done. In the library we crowd around a 125-gallon soft coral system. The centerpiece is a monstrous leather coral surrounded by seven long-tentacled anemones.

This is where Flint and the students hope to get their first batch of clownfish. A bonded pair of *Percula* clowns has been laying eggs up and under the largest of the

anemones. So far Flint has been unsuccessful in getting to them in time. He and the students have begun setting up a phytoplankton and rotifer culture station in the fish room in preparation for the day when they can remove the eggs from the library tank, or whenever the clownfish in the hallway tank spawn.

GROWING FOR THE FUTURE

It's all part of the club's plan to help save wild reefs. As the program expands, its potential to create positive change grows along with it. Each year more students in this landlocked state are introduced to the beauty and importance of something they might never see otherwise. Flint is growing more than coral here. He is growing aquarists with a respect for the natural world and an appreciation of their place in it.

The Reef Conservation Society continually seeks to build relationships with new school sites and interested partners. You can read more about the club's Tanks in Schools program at www.ReefConservationSociety.org. 

Online Web Extra: Visit two additional schools within Reef Conservation Society's Tanks in Schools Program: Walnut Street Christian School in Avis, PA, and Lake Lehman Jr. Sr. High School outside of Lehman, PA. These schools, part of RCS's growing efforts, are featured on Nate Wilson's new Reef to Rainforest Media Blog at www.Reef2Rainforest.com/category/coral-nate-wilson/.



Kaley and Divia work on epoxying rock work together at the bottom of the school's new 670-gallon display tank.