



Welcome to the Next Generation of Science Education:

A group of dedicated educators and non-profits are changing everything in public education without making headlines—but they should be.

By Dan Steinbacher

Education is often driven by a sense of lack. A lack of funding, of time, of support for teachers, of new ideas. With the wide array of problems facing large school systems like the LAUSD, it's easy to only see the areas in which lack prevails.

But for the last several years, there has been something growing—the Next Generation, which is the name of the new science standards that California is in the process of adopting, but it's also a shared perspective of a group of educators—and they see resources everywhere. Teachers are finding that they have more of the support and materials they require. There are next generation administrators, teachers, non-profit organizations and community members that have been working to build momentum, and the time for their work to be seen and heard is now.

And what could be a more appropriate hub for these Next-Gen teachers than Trash For Teaching, one of the aforementioned non-profits with the motto “Filling Minds instead of Landfills”, who rescues discarded industrial materials and distributes them to teachers along with lesson plans for turning what would have been waste into fodder for science experiments, physics models, and engineering opportunities? They transmute lack into abundance on a daily basis, from preschool to high school.

The existence of a place like Trash For Teaching, or T4T, is a welcome sight—it's bright and airy, constructed from the most surprising materials: clear plastic bottles, colorful cardboard industrial spools, reclaimed doors and it is lined with blue barrels filled to the brim of every kind of random item you can think of, from tubing to foam pieces to textiles to optical lenses. Within the walls of T4T (as well as their website), you can network with other like-minded peers, gather materials and lesson plans, acquire professional training, or get a cart with pre-sorted materials delivered to your classroom. Teachers taking an active role in this educational shift need a place like T4T, both as a resource and as a reminder that they have a strong base of support at a grassroots level.

One of the passionate Next-Gen administrators is Ayham Dahi. He is a former high school science teacher and current LAUSD Science Coordinator for secondary schools, and he planted the seeds at T4T for what would become a kind of physics fellowship. Last year, a small group of LAUSD teachers began developing and testing Next Generation Science Standards (NGSS) aligned Physics lesson plans in their classroom in collaboration with T4T, UCLA Center X, and the Natural History Museum. They began to share their projects with other teachers, and things began to grow from there.

Their Next Generation Science Initiative is in its second year, thanks to LAUSD's School Improvement Grant (SIG) Department. T4T and SIG have partnered in an effort to provide SIG teachers with support to refine and re-imagine classroom curriculum, share their ideas through professional development workshops for NGSS and Common Core, new teaching standards which incorporate elements of engineering, open-ended inquiry, and interdisciplinary project based learning. Paul Hsu with LAUSD's SIG office stepped in this year to strengthen

the movement in several ways including: funding for teacher curriculum development, workshop participant stipends, and funds for T4T project management and materials.

As the movement grows, the scale of everything is bigger. This summer, thirty-eight teachers from twenty five school participated in a 3-day symposium specifically aimed at teachers of 8th grade and high school sciences to give them hands on training in these new methods. The symposium was the culmination of a year and a half of planning and substantial extracurricular effort by a phenomenally dedicated group of teachers and administrators: Craig Sipes, the mentor teacher for the group, Michael Lusk, Evan Dvorak, Geoffery Payton and Josh Mericle, who teamed up with Shiva Mandell, Creative Director of Trash 4 Teaching, to bring this event to fruition.

Craig Sipes acknowledges this in his introduction, saying, “T4T materials are the basic building blocks for teaching the Engineering Design Process, which is integral to the Next Generation Science Standards (NGSS) at every grade level. Innovation in the real world is a slow, mindful process of asking, imagining, planning, creating, testing and improving, and this process gives students a roadmap to navigate creativity, tenacity, and collaboration. What better fuel for students than tons of open-ended materials that simultaneously inspire them to be resourceful, scientifically rigorous, yet also sustainable?”

LAUSD’s K-5/6 Science Coordinator, Lillian Valadez-Rodela is another visionary Nex-Gen administrator. In collaboration with Lynn Kim-John from the UCLA Center X and T4T, Lillian and her devoted group of teachers just wrapped up a 4-day Teacher Institute serving about 130 Elementary School teachers called “Engaging Young Minds.” Combined with the teachers from the SIG workshop, that’s nearly 170 teachers who gained professional development using T4T materials in one week. When you realize that each Middle & High School teacher has 5 or 6 periods a day with an average of 35 kids in each class, you begin to see the scale at which T4T and LAUSD is working on.

This is the Next Generation in a nutshell—collaborative, proactive, community-driven educators that are working at every level way to make the entire system better— they’re educational engineers. Their numbers are growing, and they’re banding together to make big waves in our public schools. It’s no surprise, then, that they all are drawn to Trash For Teaching.

Mandell, who in addition to his role at T4T is also a trained architect, is an advocate for hands-on learning through a fusion of hi-tech and low-tech classroom resources that he calls inventor-tech, the kind of materials and experiences that morph a student from a passive learner into a budding engineer.

“What if we expanded our definition of technology beyond iPads to include any tool that helps us understand & re-imagine the world? In the hands of curious, empowered students, all T4T materials are technology, specifically inventor-tech, and they’re cost-effective ones at that! Students need to physically create and manipulate, and when they do their curiosity, patience, and confidence skyrockets.”

The Next Generation isn’t coming, it’s here already. It’s waiting for you to find the place where you can pitch in, and there’s certainly no lack of enthusiasm, optimism, or expertise. What they need, however, is the room and funding to grow even bigger. The more that teachers, parents, and communities find out about the Next Generation Science Standards, the more excited they get at the possibilities it offers. The only place to go from here is up and out—up in scale and out into the educational community at large, showing students and teachers that they already possess the power to re-shape their world.