



littleBits™ **education**

INVENTION AND CREATIVITY “STEAM” ROLL MARYMOUNT SCHOOL NYC WITH A 1:1 LITTLEBITS PROGRAM

IMMERSIVE PROGRAM BUILDS PROBLEM-SOLVING AND CRITICAL THINKING SKILLS

Table of Contents

4 [Giving Girls the Space to Invent and Explore their Passions](#)

6 [1:1 littleBits Implementation Encourages Girls to "Think in Bits"](#)

7 [The Impact: Cultivating a Vocabulary of Invention](#)

Based in New York, Marymount School is an all-girls school that is committed to developing the lifelong skills of creative and critical thinking.



The littleBits 1:1 program came to Marymount School thanks to an innovative and inspirational art teacher turned STEAM enthusiast, Lesa Wang.

Lesa first stumbled across littleBits in a window display at the Museum of Modern Art Design Store. Captivated by littleBits' library of magnetized and modular circuit boards, Lesa was excited by the sophisticated high-tech product's ability to hook kids of all interest and skill levels -- and give them a platform to turn their ideas into inventions.

She was interested in finding ways to incorporate more of that into her lessons.

Giving Girls the Space to Invent and Explore their Passions

Marymount was already forward-thinking in its approach. It was the first independent girls school to offer its students a Fab Lab -- a space to freely explore the latest in digital fabrication and maker education.



Lesla had been quick to learn how to use the machines in the Fab Lab, using the vinyl and laser cutters to embellish the walls with whatever materials she could think of: “We used the vinyl printer to adhere inspirational quotes throughout the building and the laser cutter to make custom signage throughout the school. It was the best way to learn how to use the machines.”

That first year in the Fab Lab changed everything for Lesa, who spent a lot of free time in the lab tinkering and prototyping ideas for student art projects. And with maker education developing in the 6th-8th grade, Lesa started to question what happens to students pre-and post-time spent in the Fab Lab.

That led to the design and branding of Marymount's three other maker spaces; the Tinker Lab for grades K-2, the recently opened STEAM Lab for grades 3-5, and the iDea lab for grades 9-12. Lesa was an integral part of the design and build-out of Marymount's makerspaces. And with Marymount's makerspaces came the development of its STEAM program.

Now in its sixth year, Lesa still considers the STEAM program as a working prototype, with new iterations and collaborations happening each year.

“The goal of our STEAM program is to give the girls a chance to apply their learning in not only math and science, but other subject areas as well.”

Lesia Wang, STEAM Teacher

Lesia continued: “We hope to keep our students’ eyes of wonder wide open. To provide them with a tool kit for iterating ideas. To give the girls challenges which allow for their individuality and creativity to shine. To prepare the girls with a solid foundation from which to move.”

Incorporating littleBits into her teaching was one way that Lesia could enable students to explore how creativity is intricately and fundamentally tied to science, technology, engineering, and math. “We need to think different - AND teach different - if we want to help solve all the problems we

have created in this world. My hope is that one of my students will find a cure for cancer or will invent something that will improve the lives of others. Working with our girls gives me hope that we can make the world a better place. They LOVE learning to code and rapidly prototype their ideas. We are starting a robotics club and their enthusiasm is contagious. They constantly amaze me with their clever inventions.”

1:1 littleBits Implementation Encourages Girls to “Think in Bits”

In 2013, Marymount’s Lower Middle School implemented a 1:1 mobile-making program with littleBits, where students in grades 3-5, receive their own custom-curated littleBits kit and can travel from classroom to classroom with their Bits. Students in other divisions at the school also have access to three littleBits Pro Library kits for rapid iterating.

A few weeks after the 1:1 rollout, for Halloween, all of the teachers in the Lower Middle School dressed up as their favorite Bit in a show of excitement and unity for students. Everyone was on board. It wasn’t just a tech department thing; the littleBits roll-out included pollinators from all subject areas. Lesa truly paved the way to making littleBits cross-curricular.



Says Lesa, “In class, we explore how — and why — materials matter through various lesson plans with real-world implications.” Some examples she shared are as follows:

- I challenged my students to redesign Central Park’s Ancient Playground. Taking cues from The Three Little Pigs we used straw (Strawbees), sticks (wood), and bricks (Legos) to design playground equipment.
- We are exploring our autonomous future by designing concept cars with LEGOs and littleBits.
- During the holidays, students were encouraged to illustrate the “12 Days of Christmas” with their Bits.
- We’ve explored computational thinking and algorithms by making vending machines, complete with buzzer Bits, the light sensor Bit, and more.

But despite the simple prompts, Lesa mentions that her students are constantly inventing. They often challenge each other to think outside the box, not to mention share knowledge. In fact, many of the students have become teachers, themselves, showing adults how to work with Bits.

Marymount recently created the Harlem STEAM Consortium to broaden access to STEAM education for students in its local community. As part of the program, 21 teachers from public, charter, and parochial schools near its campus joined a professional development workshop facilitated by Marymount faculty and students. The workshop featured a design challenge to build an arcade game using littleBits and thanks to a generous donation from Goldman Sachs, each school received 15 littleBits kits to take back to their schools and integrate into their curricula.

The Impact: Cultivating a Vocabulary of Invention

As STEAM took hold, Marymount increasingly became an immersive technology school where invention and technology were an essential component of every subject.

“The girls talk about prototyping and love explaining how sensors and circuits work; in using littleBits they are able to accumulate a vocabulary of invention,” Lesa said. Students are often asked to teach teachers and visitors to the school on how to work with littleBits. “Our lower middle school girls can run maker workshops that engage learners of all ages and skill-levels.”

Marymount’s K-5 program has successfully built a pipeline to Upper Middle School where the girls work in the Fab Lab and take on more sophisticated coding and physical computing.

The program has been so successful that it was featured on CBS’ 60 Minutes. One eighth grader -- a veteran of Marymount’s K-5 program -- explained, “Science is my favorite subject. I like to create. I like inventing things. I like playing around with computers and technology and physics and I want to be an astronaut when I grow up.”

