



ROBOTICS in your class is a **MUST**  
Get ready for a **CLASS SOLUTION**

**TOOLS**

**CURRICULUM**

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**FULL TRAINING**

**AFTER SALES SUPPORT**



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Plan for 2017-2018

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# Why robotics in K-12 STEM Classrooms?

## What is the benefit of bringing robotics directly into K-12 STEM classrooms?

Robotics is often used in clubs, after-school activities, and competitions to expose K-12 students to technology, engineering, math, and science. But this typically reaches a group of self-selected students who already have an interest in STEM.

In order to democratize access to the benefits of project-based learning through robotics, The Little Engineer is working to train K-12 teachers who can bring it directly to classrooms.

We have developed series of [robotics courses for different grades](#) to engage learners through hands-on learning activities with concrete experiences.

K-12 students not only learn the STEM content, but also gain self-efficacy and a new view of their own capabilities as a STEM student. They can see themselves as programmers, problem-solvers, leaders, and potentially part of a future STEM work force.

Robotics can provide school administrators and teachers tools to develop integrated STEM programs, empower teachers to improve STEM career awareness among students, and allow STEM teachers to incorporate technology in their classrooms in a meaningful way. Robotics allows students to learn STEM content while working with tools used by engineers and experiencing engineering design as a model for problem solving.



## Hallmarks of our teacher professional development programs:

*Hands-on Learning:* The program helps teachers encourage students to participate in their learning, encourage teamwork, allow students to contribute based on their strengths, with lessons that convey STEM concepts in an effective and engrossing manner. Teachers are trained to bring alive, typically abstract, difficult to learn, and difficult to teach math and science concepts through the hands-on lessons. Relating STEM concepts to students in a personal and meaningful systems context enables teachers to make complex material reachable as well as engaging. Incorporating social issues or design challenges into STEM teaching and learning allows teachers to demonstrate the crosscutting nature and relevancy of the material. Training allows teachers to use current technologies in the classroom to increase STEM career awareness among students.

*University students as curriculum developers and teachers:* The integral involvement of University students, both undergraduate and graduate, in curriculum development and teacher professional development, is unique to our strategy. These STEM experts are training teachers in STEM curriculum and serving as mentors to young students. The K-

12 students see the graduate students as role models, and the teachers rely on the graduate students for their content knowledge and ability to present scientific concepts in exciting new ways.

*Teachers as collaborators:* We rely on teachers to act as collaborators and sources of feedback and classroom observations to iteratively improve and tailor curriculum

*Schools as partners:* In order for a program to succeed, it must be adopted and supported by multiple teachers within a school who also have the support of their Principal. Our programs are most effective when they are incorporated into the school culture. We also rely on schools as partners towards the goal of increasing diversity in STEM by ensuring that STEM electives, after school programs, or summer programs are as gender-balanced as possible.

*Research-based:* As an academic and research institution, we develop our teacher training strategies and programs based on peer-reviewed research. In addition, recommendations from major teacher professional organizations are followed. Accordingly, both our teacher PD and associated curriculum use the Problem-based Learning (PBL) construct and we aim to conduct teacher PD for a minimum of 160 hours, ensure that teachers are aware of the extent to which content is aligned to state and district standards, and help teachers cultivate their professional learning community.

### **K-12 Teacher and Principal testimonials about The Little Engineer professional development programs:**

“The level of excitement surrounding the robotics program is unparalleled. As a project-based school, we are constantly looking for more ways for students to explore concepts and ideas on their own, and already there has been an incredible source of investigation with the robotics program that will only be developed further.”

“The robotics program is truly serving as a means to bring excitement to learning science and math throughout all classes and there have been a number of students that have gained an interest in either computer science or engineering through this program that would not have had this opportunity otherwise.”

“This program has had one of the greatest impacts on the culture and outlook of the after school science program at our school.”

“Seventh grade has been able to see “math in motion” through the use of the ABILIX robotics. Concepts such as ratios, proportions, graphing relationships, and equations are just a sample of the topics the program has helped my students build a deeper understanding.”

“The robotics program has been a great benefit to our students, both in the classroom and out. The students see a real application of their math and science skills and are very enthusiastic about STEM! Additionally, I have seen from many of the students, a perseverance in problem solving until they get the “answer.””

“The support of this program has ushered in a generation of inspiring students to pursue STEM fields. Our robotics program has sustained growth, and enthusiasm among the student body and parents. The professional development has given me the confidence and ability to deliver outstanding instruction in robotics.”

“We have seen our former students flourish in high school, pursuing paths directly related to engineering and now we have several students who are going to college to pursue engineering majors.”

“If not for this program, I truly believe we would never have seen such a finely developed, interdisciplinary STEM curriculum and the payoffs related to such. It is my hope that we can continue these programs as they are at the heart of all we hope to achieve as a nation.”

“This program is simply phenomenal because not only do the students get to utilize their multiple intelligences they also look at the world through the lens of an engineer.”