

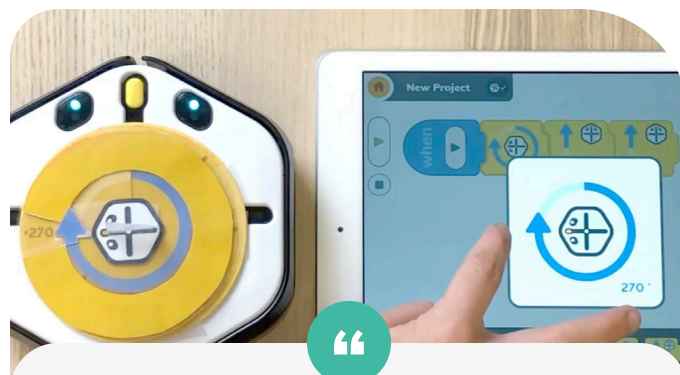
Using the Root® Coding Robot to Fold Sustainability and Entrepreneurship into STEAM and Maker Education

With the help of iRobot Education's learning tools, ESSTEAM Lab has been able to grow their educational programming, the goal of which is to teach STEAM and Maker education through the lens of sustainability and entrepreneurship. The nonprofit's founder shared positive insights associated with integrating the Root® rt1 coding robot into programs, including:

- Maximizing learning time through the Root coding robot's simple set up and quick rollout.
- Advancing toward sustainable teaching and learning through the ability to use the Root robot with students of mixed age groups and skill levels year-over-year.
- Increasing opportunities to reuse and repurpose materials using lessons featured in the iRobot Education learning library.
- Increasing opportunities to develop new educational programs.

The Ongoing Challenge of Identifying Sustainable STEAM Tools

Pronounced 'esteem', the ESSTEAM Lab is a nonprofit organization that relocated to Summerville, South Carolina, United States in 2020. The nonprofit offers programs and resources to local students with an emphasis on integrating sustainability and entrepreneurship into STEAM and maker education.



My focus is on how to make STEAM and Maker education as sustainable as I can. What that looks like is not just teaching about sustainability but considering materials that are versatile and reusable, which is one of the reasons I was drawn to the Root coding robot. It can be used with multiple grade levels; the robot grows with the students.

Katie Monsma

Founder and Program Coordinator
ESSTEAM Lab, SC

By introducing STEAM and maker education through the lens of sustainability and entrepreneurship, the nonprofit teaches students to consider the lasting impact and deeper meaning behind their actions. Instead of merely responding to the problem itself, students are challenged to expand their perspective and produce solutions that carefully consider the impact on long-term environmental, economic and societal well-being. The result? Solutions that meet the needs of the present, without compromising the needs of future generations.

As part of their initiatives, ESSTEAM takes pride in not only teaching about sustainability and entrepreneurship but practicing it as well. Being a nonprofit, the organization relies on donations

to make their programs possible. This means their main challenge is to leverage their budget to purchase sustainable STEAM tools that will support their students learning, year-over-year.

The Search for Versatile and Reusable STEAM Tools

ESSTEAM Lab takes a number of elements into account when assessing a tool's sustainability, including their: capabilities, intended age group or skill level, cost, and expected lifespan. For example, some robots require assembly prior to use and fall apart after heavy use, leaving them incomplete for future programs. Other times, robots will lack the flexibility to accommodate mixed ages or skill levels, making individualization challenging.

When ESSTEAM Lab first discovered the Root® coding robot at the Maker Faire Bay Area, they were drawn to its versatility and reusability. In particular, they were impressed by its ability to teach multiple age levels, “growing” with the students as they progress. This ability, along with the robot’s abundance of programmable features, spoke to the sustainability of the tool: the idea that it would integrate smoothly into programs well into the future.



learning level 1

learning level 2

```
robot.whenProgramStarted {  
  robot.markerDown ()  
  for _ in 1 ... 4 {  
    robot.move( 16 )  
    robot.turn( right , 90 )  
  }  
}
```

According to ESSTEAM Lab, their students enjoy programming the robot to navigate magnetic whiteboards, play music and flash a variety of colors. Without the need to assemble the robot, deploying the Root coding robot is simple and quick. Further, the nonprofit enjoys reusing and repurposing activities from iRobot Education’s learning library to align with their programs.



Paving the Way for Future Programs

ESSTEAM Lab began by teaching students how to code the Root® coding robot to move and drive, and before they knew it, were coding the robot to sing and dance. In future programs, they look forward to leveraging the robot’s expandable design using its Root™ Brick Top accessory and their own 3D printed creations.

“3D printing is the bottom-up approach to Making versus using laser cutting or wood carving—where you take away material to get a finished product. These are two different ways of approaching sustainability, making students really consider what is the best way to build what they are trying to build,” said Monsma.

Learn more about ESSTEAM Lab at essteamlab.org