FROM THE CLASSROOM

Plant Bot

What an eight-year-old at Magnanibots imagined for a pest on Colombia's Caribbean coast.

Margarita Oliveros · Academic Director · August 2026

The student at work on his robot. Magnanibots, August 2026.

An eight-year-old student came to the lesson already knowing that *el picudo del algodonero* is a hard-shelled beetle that attacks cotton crops in the Colombian Caribbean, and that it is hard to control. By the time the lesson ended he had met a robot that moves through a crop and detects a pest, and he had decided to design one of his own. He called it Plant Bot.

It was his first time in a program like this. Until then he had built with LEGO bricks and played Minecraft.

The lesson is called Buggy Bugs and is part of *Fundamentals of Coding with SPIKE Essential*, from **Carnegie Mellon Robotics Academy (CMRA)**. It opens with TartanPest, developed at Carnegie Mellon University to help control a pest that attacks crops, and goes on to a robot each student builds and programs until it works. The name plays on both sides of the word: a *bug* is an insect, and it is also an error. In Spanish the pun does not exist, so our students meet both meanings at once, in a language that is not their first. He got it right away.

That is where he ran into his own. A piece had ended up in the wrong place, and the rubber band, instead of sitting taut, was slack and did not transmit the motion.

A boll weevil on a cotton flower. Photo: Steve Ausmus, USDA/ARS.

When he programmed it, the blocks were in the wrong order, so the robot did the right things but not in the sequence he wanted. Each time he had to look at what was happening, find the problem, change something, and try again.

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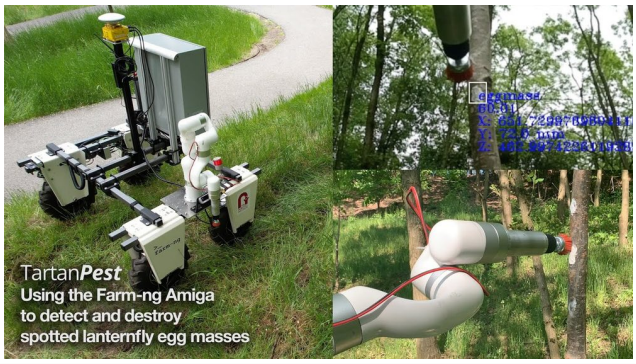
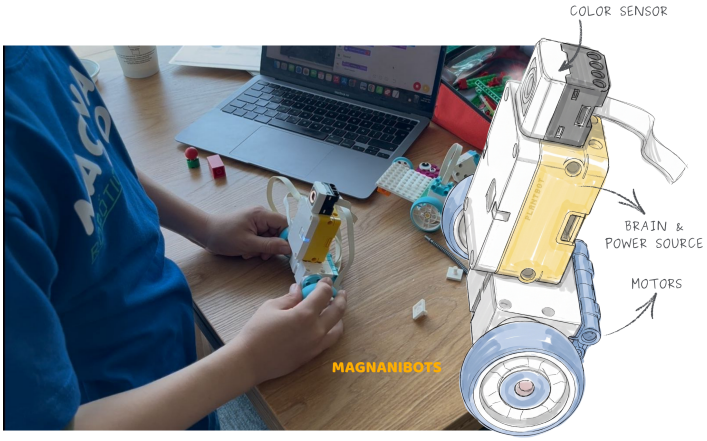


TartanPest. Carnegie Mellon University, 2023.

With the time left in class, inspired by *el picudo* and by TartanPest, he set out to design his own robot. He thought about the ground and gave the hub wider wheels. He thought about how it would find the insects and gave it the Color Sensor for a head, so it could see. Plant Bot is a prototype — for now. Getting to a robot that moves on its own, senses, and makes decisions takes a sequence of lessons. Some of them are in the program he will reach later, *Coding and Computational Thinking with LEGO SPIKE Prime*.

What is interesting is not only that he built a robot. He took a problem he knew, connected it to something he was learning, and used it to imagine a solution — and without knowing it, he was onto something.



Plant Bot — Prototype by an 8-year-old student. Magnanibots, Barranquilla, Colombia, 2026.

TartanPest, the robot the lesson opens with, goes for the egg mass directly — something visible on the outside of a surface. *El picudo* larva is the opposite: it develops inside the cotton square, invisible from the outside. What a color sensor can read is the plant's response — the color changes that the damage triggers, which can signal not only that the pest is there but how long it has been — early enough to still save the crop. A robot carrying that sensor could read them across every row, in any weather, without anyone having to walk there. Those signals are real and measurable, and no published robotic system has read them yet. In the Colombian Caribbean, this pest drives seven out of every ten pesticide applications on cotton farms and can destroy up to 70% of a harvest when left uncontrolled.

Comparative timeline: a healthy square, sealed some 25 days until the flower; a punctured one, fallen in 5–8. Based on Jeger et al., *EFSA Journal*, 2017. Magnanibots, 2026.

He didn't know any of that. He just gave his robot a head that could see, and pointed it at the plant and at color. That turns out to be exactly where the problem lives.

Who knows — he could be the one to fill it, with his Plant Bot.

This is not an isolated case. It is what we have begun to see in class since April 2026, and it is a result of our alliance with the **Carnegie Mellon Robotics Academy (CMRA)**.

On one side, because of the alliance we bring into the classroom programs developed by scientists, engineers, and education experts at CMU, built around real problems and applications of robotics. As instructors we also receive the training to deliver those programs and to certify our students, so they can make what they have learned visible and start building a portfolio.

On the other, **Magnanibots** provides the prepared environment where they come to life: a bilingual, hands-on space for groups of no more than five students, where they build, program, test, get things wrong, ask questions, and explore beyond the activity in front of them.

When children and youth go through this again and again — a problem, an idea, back to it until it works — they are not only learning to build and to program. They are discovering that they can solve a challenge, and gaining the confidence to build what does not yet exist.

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