Literature as a Pathway to STEAM Careers

Michelle Mohrweis
Engineering Teacher at Bogle Junior High

Literature as a Pathway to STEAM Careers

Abstract

In this piece, I discuss the way STEAM focused literature can help guide students into the world of STEAM. Through books, kids can see themselves doing STEAM focused careers, helping to make it more accessible even to groups still underrepresented in many technical fields. STEAM in children's literature can also help students navigate important skills, such as the design process and learning how to have a growth mindset.

Keywords

KidLit, Children's Books, STEAM Literature

Creative Commons License

Literature as a Pathway to STEAM Careers

Michelle Mohrwei

When people think about STEAM, they rarely connect it to literature. Especially not the

area of literature fondly called Kidlit, composed of picture books, middle grade, and young adult

novels. Yet the world of Kidlit holds much potential to draw students into STEAM and set them

on a path to future careers in science, technology, engineering, art, and math. Our students learn so much from the literature they consume. Books often act as a guide for many of us. When those books include STEAM themes, then it gets students thinking about the possibilities.

This is good news, especially in recent years. There is a wealth of STEAM books being published in Kidlit. From
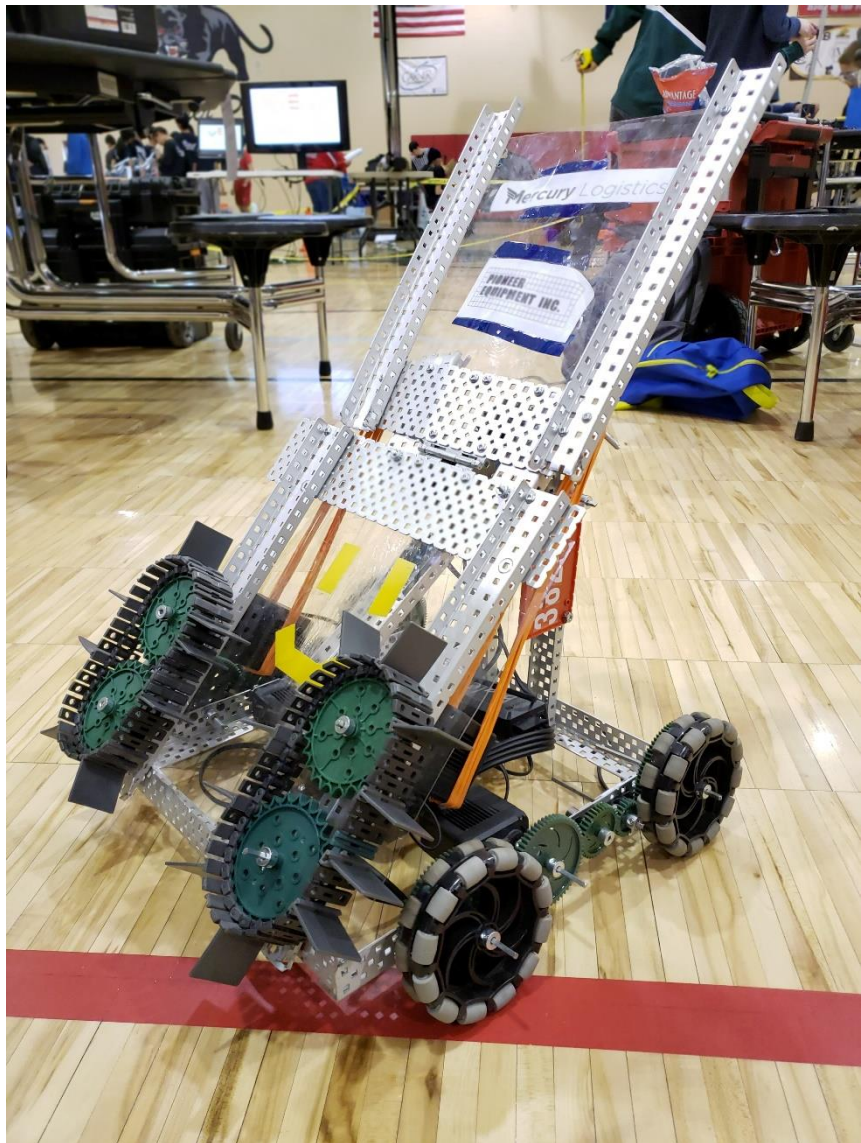
books where kids engage in engineering, like MARY UNDERWATER by Shannon Doleski or THE HOUSE THAT LOU BUILT by Mae Respicio, to books that show kids learning about astronauts and the possibility of space travel like in WE DREAM OF SPACE by Erin Entrada Kelly. There are so many recent books that feature STEAM concepts within their plots.

These books aren't just entertainment for students. They are a window into the possibilities of the world. When kids read about students their age interacting with STEAM, it gets them thinking that they have those opportunities as well. This is especially important for those who don't always see themselves represented in STEAM careers, like girls and members of marginalized communities. The diverse casts in the modern STEAM focused Kidlit books can help kids picture themselves in those careers, encouraging them to show an interest even if they don't always see people who look like themselves working in those jobs yet.

I've seen this in my own classes, with my own students. I teach engineering and robotics at the middle school level. I'll often have classes of twenty-five boys and five girls. Every year I talk to them about engineering careers and the possibilities of
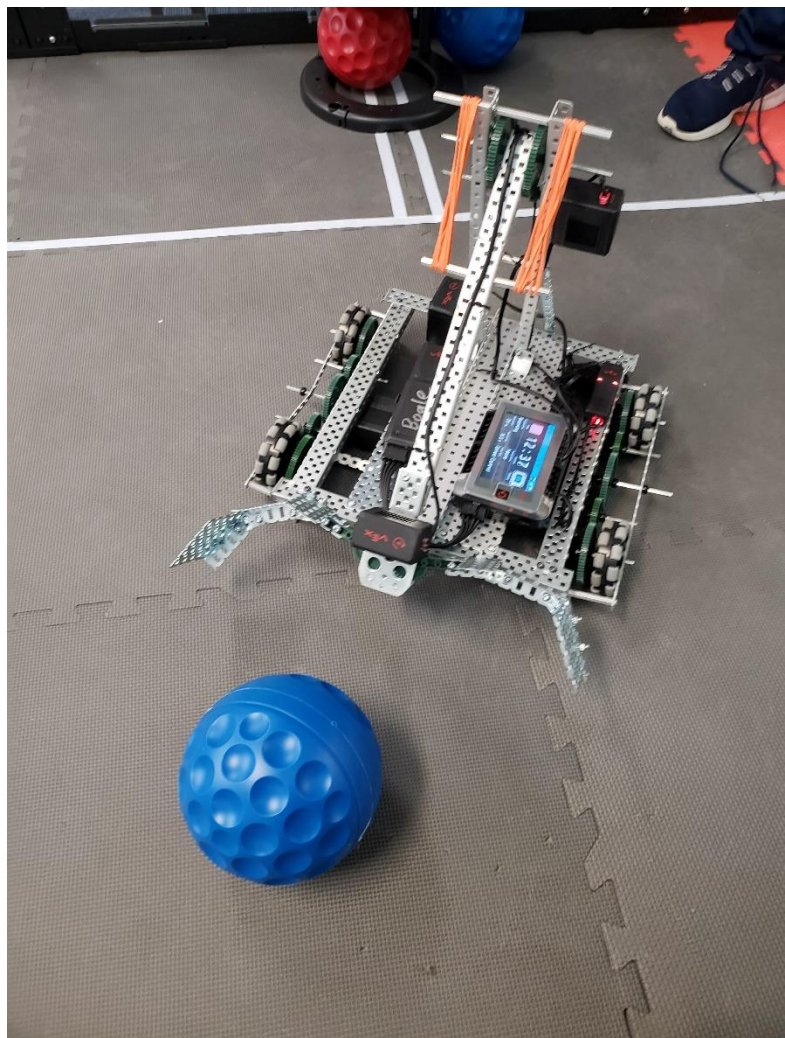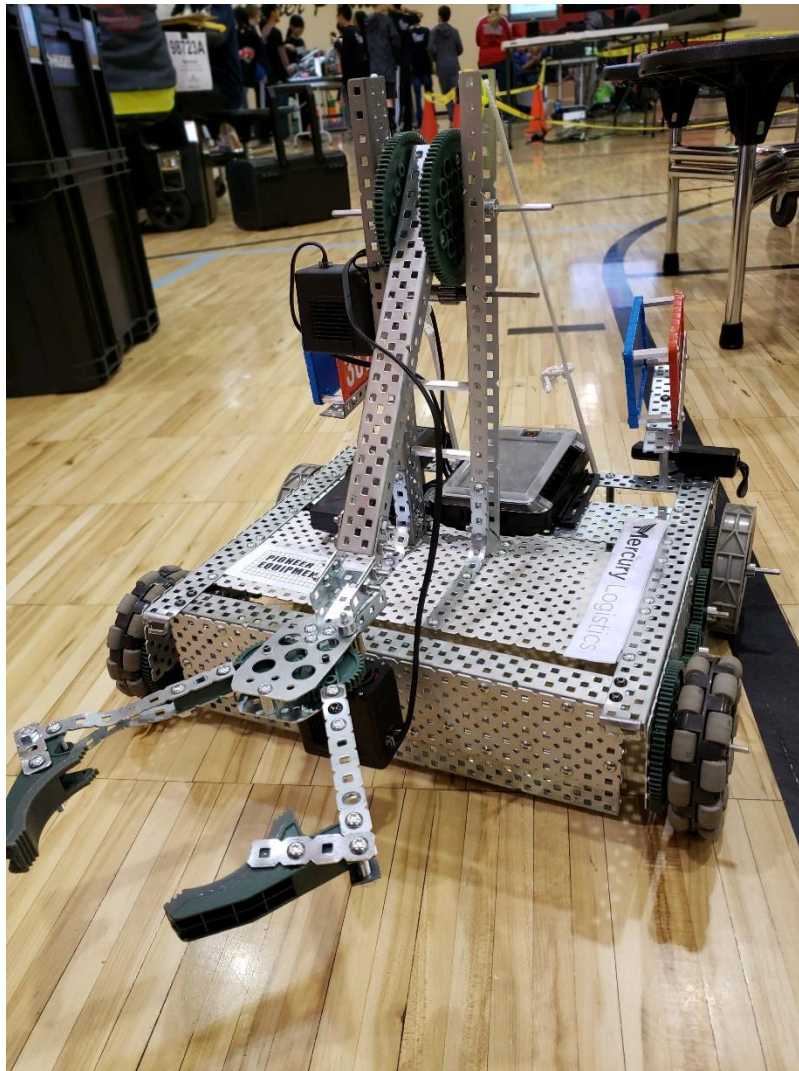
engineering. I'll never forget the moment one of my girls asked me, "Are there really girls in engineering?" When my students look at the world, they see a traditionally male dominated career. In movies and TV, the engineers they see are typically middle-aged men. The media they consume tells them that this is not a career for them by not including them.

Yet Kidlit is defying this. Books like EMMY IN THE KEY OF CODE by Aimee Lucido show girls learning to program and preparing themselves to enter a field where they will often face sexism in their jobs. Books like WHAT STARS ARE MADE OF by Sarah Allen and THE THING ABOUT JELLYFISH by Ali Benjamin feature girls engaging with and excelling at science like it's the most natural thing in the word. These books are helping break down barriers by showing kids that anyone can excel at STEAM. Anyone belongs in STEAM careers. It opens a door for students to see themselves in those careers, even if the world doesn't show them that yet.

Furthermore, by including STEAM in books, we can teach students so much about the process scientist and engineers follow. In CLUES TO THE UNIVERSE by Christina Li, the main character Ro is building a rocket. Throughout the story she must follow the design process, building, testing, and modifying her rocket as she goes. Though it's never said in as many words, the story shows a powerful growth mindset and encourages readers to keep trying and keep learning, to even learn from when things fail. This is a valuable skill in engineering. We can see this again in A FIELD GUIDE TO GETTING LOST by Joy McCullough when the main character, Sutton, attempts to program a robot. Throughout the story readers see her try, fail, and then learn from that failure and try again. These examples of growth mindset can show kids from an early age that it is okay to fail. In fact, failing is a critical part of STEM. After all, we can

learn so much from our failures, especially if we use them to make the next iteration of a design better.

This is a valuable lesson. It's one I often see my students struggle with. In my robotics classes, my students want their robot to be perfect. I once had a group spend four weeks building their robot. Every part was in place. Every piece was perfectly aligned. But when they went to test it for the first time, the robot fell apart. Instead of trying to fix it, they started again from the ground up, building an entirely new robot. Once again, it failed when it came time to test it. They were forgetting an important thing. They were forgetting to follow the design process. After the second failure, I encouraged them to look closer at their robot. Instead of scrapping it again, what could they fix? What could they improve?

They started with the wheels, then the lift mechanism, then the rest. Every time it failed, they had to fight that urge to scrap it and restart. Instead, they kept building. Kept adding to it and modifying what didn't work until finally they had a robot that could roll around and pick up spheres in a mini arena.

It was a hard lesson to learn. They wasted so much time when they scrapped the first robot and completely restarted, and the first design was one that could have worked if they stuck with it.

In our society today, perfection is often the end goal, but students forget how to work towards that. Many of my students have a challenging time accepting that failure is okay as part of that process. They want to build something and have it be perfect the first time. When it doesn't work, they think they need to start over completely, instead of fixing what they have. Students often forget that it's okay to fail, as long as each failure teaches you something and helps you reach for eventual success.

When this was happening, I wished dearly that I could show them examples of students going through what they were. But there aren't many kidlit books about robotics yet. There were no examples I could read to them, to show them examples of engineers failing and fixing their robots. That may change someday. I myself used that moment as inspiration and later started writing a story about a group of kids in competitive robots. That story is now with my literary agent, and perhaps someday will be out there in the world for kids to read.

Luckily there are so many other STEAM books in other areas. From building submarines in MARY UNDERWATER, to designing an app in CLICK'D by Tamara Stone, we are seeing a powerful rise in the amount of books that feature STEAM. These books show kids navigating the challenges of growing up, all while interacting with science and engineering. They show how art can be in every aspect of STEM, how growth mindset is important and learning for failure is normal. These are books that will guide students into STEAM careers and help shape the next generation of scientists, programmers, and engineers.

I just hope this trend continues in the world of kidlit. The world needs more books about

STEAM, books that can help kids realize these aren't some impossible careers just for geniuses, but rather something any one of them can achieve.