

Toyota USA Brings Math To Life on the Assembly Line with Spark 101 STEM Skills Videos

Spark 101 STEM Skills Videos Help Students Connect STEM Coursework to Career Pathways in Advanced Automotive Manufacturing

With the support of the Toyota USA Foundation, teachers nationwide have new resources to help students see real-world applications of science, technology, engineering and math (STEM) skills in advanced automotive manufacturing settings. Teachers are invited to use Toyota's three new Spark 101 STEM Skills Videos to engage students in authentic problem solving required at one of the largest manufacturing facilities in North America.

While students might see the applicability of STEM coursework to automotive design and engineering, they don't often think about potential STEM pathways in manufacturing. A recent [Brookings Institute study](#) found that manufacturing businesses are having a much greater difficulty finding workers with STEM backgrounds than companies in any other industry. In another study, [Deloitte looked into the importance of STEM skills for manufacturers](#), estimating that over the next decade, manufacturing will need to fill 3.5 million jobs, and 2 million of those will be difficult to source due to the STEM skills gap.

The Toyota USA Foundation turned to [Spark101.org](#) for a unique solution to engaging diverse students in STEM coursework and strengthening pathways to potential careers in manufacturing. In 2015, the Foundation awarded the non-profit a grant to, "increase STEM engagement for 20,000 students through Spark 101's free, short, career-based case study videos connecting high school coursework to STEM careers, specifically those in advanced automotive manufacturing."

Spark 101 STEM skills videos, presented by employers like Toyota, use an online interactive video format to let students work on real challenges faced by professionals in business, government, nonprofit, and academic institutions. The 10-minute classroom videos—co-developed by educators, employers, and Spark 101 design experts—engage students in authentic STEM problem solving, aligned to curriculum and educational standards for easy classroom integration.

In Toyota's Spark 101 challenges, students are asked to apply their algebra and geometry skills to help Toyota engineers solve advanced manufacturing challenges such as:

- calculating [accurate measurements to consistently produce identical vehicle parts](#) at any Toyota manufacturing plant around the world;
- upgrading a [communications system for a fast-paced assembly line](#) without interrupting the production process; or
- identifying and addressing delayed performance times of a [robotic machine press](#) that stamps sheet metal into car parts.

Thanks to the support of employers like Toyota, secondary teachers can access more than 50 free Spark 101 STEM skills videos and curriculum-aligned teaching materials online at [www.spark101.org](#).

"As a teacher, I appreciate Spark 101's ability to take my students virtually into a workplace to foster their imagination and critical thinking," said Susan Patterson, a high school math teacher in Texas and Spark 101

Teaching Fellow who visited Toyota's Kentucky plant to help design the challenges and lesson plans. "I love watching my students work through the challenges, using their knowledge in ways that prepare them for real life."

Spark 101 STEM skills videos use a format proven to be effective in schools. A 2015 independent evaluation found that all students exposed to Spark 101 increased their STEM career awareness and skills, with significant positive effects on STEM engagement among students with little previous STEM understanding or interest. Surveys also showed that 80 percent of students want teachers to integrate case study challenges into classwork and want employers to provide more case studies. For the complete evaluation, see "Using STEM Case Studies to Prepare Today's Students for Tomorrow's Jobs: An Evaluation of Spark 101 Interactive STEM Videos."

Spark 101 is a program of the 114th Partnership, a national nonprofit that helps students navigate education and career pathways. By connecting classwork to professional pathways, the organization will equip one million students with the knowledge they need to connect their personal passions to high opportunity careers.

"Each year four million students graduate high school without having had an opportunity to tackle a real-world problem. And employers need options other than internships to introduce students to viable careers and critical skills," said Jane Kubasik, founder and president of the 114th Partnership. "We are excited to add Toyota's real workplace challenges to our library to help more learners connect passions to manufacturing career pathways while cultivating the necessary STEM skills to drive future innovation."

To see Toyota's Spark 101 STEM Skills Videos and log in for complementary lesson plans, visit <http://www.spark101.org>.

The Toyota USA Foundation is a \$100 million charitable endowment committed to enhancing the quality of education by supporting innovative programs and building partnerships with organizations dedicated to improving teaching and learning of science, technology, engineering, and mathematics. For additional information about the Toyota USA Foundation, please visit <http://www.toyotagrants.com/foundation>.



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