



case study

empowering the workforce of the future

chevron invests in STEM
education to inspire the next
generation of innovators

human energy®





chevron's education partners fuel interest in STEM by supporting schools and preparing the workforce of the future to succeed

It's open house at Frazier Middle School in the rolling hills of rural Perryopolis, Pennsylvania, and the classrooms buzz with excitement. Students launch miniature hot air balloons, scrutinize contents of a robotics kit and propel paper hovercraft across floors. A short drive south, in the community of Grindstone, high school students design and build portable speakers in a fabrication lab. And across the country, in the flatlands of western Texas, Odessa College students assemble robotic cars designed to protect an egg placed inside during a robot duel.

In these and other communities where Chevron operates, we partner with innovators who increase opportunities for young people by teaching them about science, technology, engineering and math—STEM. Since 2013, we've invested \$400 million to support education globally with programs that have reached more than 650,000 students, teachers and parents.

"Our support for STEM education helps communities prosper and engages many people in the process. We choose partners that have track records of inspiring kids to take up STEM, and then we turn them loose to do what they do best," said Janet Auer, who manages education partnerships supported by Chevron. "Our hope is that students think about how STEM can create a better future for themselves and do great things that benefit us all."

partnerships that inspire

Among Chevron's education partners are the Fab Foundation and Project Lead The Way (PLTW), both of which develop critical-thinking, problem-solving, teamwork and analytical skills through hands-on learning. The Fab Foundation creates Fab



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**our partnership with
project lead the way**

**180,000
students**

have experienced STEM firsthand, including 55,000+ female students in nine states and Washington, D.C.



**\$16 million
invested**

to PLTW since 2009



**2,700+
teachers**

trained in PLTW STEM curriculum
in the 2016–2017 school year



**86,000+
students**

enrolled in Chevron-supported
PLTW programs in the U.S.

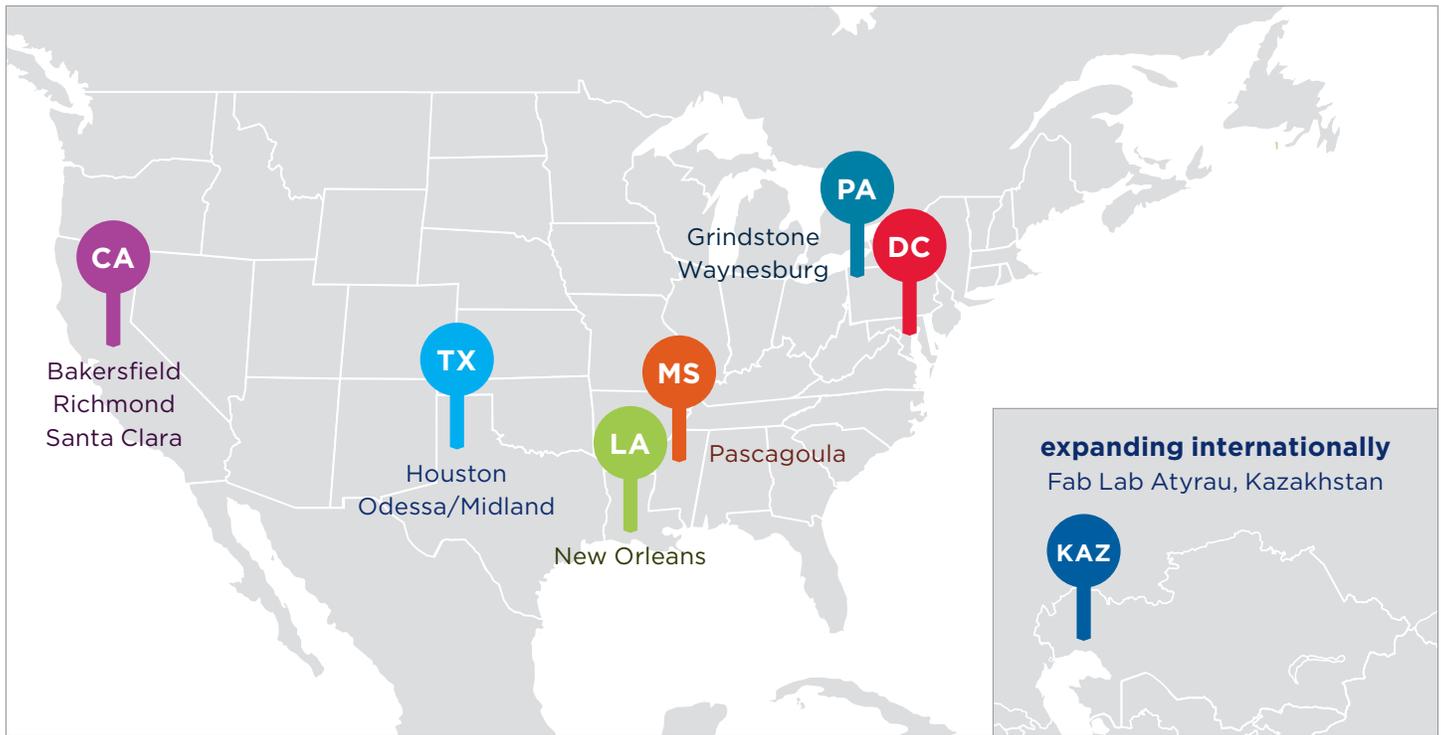
Labs (fabrication laboratories) to teach STEM in an environment where students are able to use precision machinery, software and other tools to make just about anything—from circuit boards to prosthetics. With Chevron’s support, PLTW classes began in the Frazier School District in 2012, offering STEM-based curricula for elementary, middle and high schools.

“Our community is astounded about what we’re doing with STEM in a middle school,” said Frazier Middle School technology education teacher Michael Premus. “We have kids that go from wanting to turn wrenches on big rigs to becoming engineers because they are inspired by learning how to design, make and build things.”

Frazier Middle School is in a region that contains one of North America’s largest and richest sources of natural gas from shale. Not long ago, the school’s technology program was nearly

abandoned, and technology activities were limited to basic woodworking, shop and industrial arts classes. With these partnerships, students at Frazier Middle School became the first in the district to have 3-D printers, the latest computers and advanced software programs.

Principal Michael Turek said the partnership revolutionized the school’s technology program. “Success wouldn’t occur without Chevron’s support, a committed school district and teachers, and a willingness to take on a different way of teaching kids. When you see engaged learning from both boys and girls working together on STEM activities and have middle school kids ask to be part of PLTW in high school, that’s an obvious measure of success.” Another gauge of success: In this district of 1,300 students, PLTW has expanded from only middle school to encompassing fourth through 12th grades.



our partnership with fab lab

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a different approach to workforce development

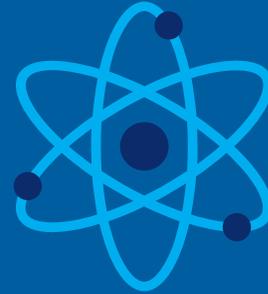
The need for skilled workers in STEM fields is an economic imperative in southwestern Pennsylvania, eastern Ohio and West Virginia. Fueled by the area’s natural resources, job growth is expected to rise by more than 30 percent by 2025. However, in southwestern Pennsylvania alone, there is a potential shortfall of 80,000 science and engineering workers, according to the Allegheny Conference on Community Development, a public-private partnership that works to improve economic conditions in 10 counties in Pennsylvania. A new approach to education and workforce development in the region was needed.

Fab Labs, with their suite of digital fabrication tools and prototyping machines—including laser cutters, 3-D printers, vinyl cutters and milling machines—are inspiring young people in southwestern Pennsylvania, and across the United States, to learn about STEM.

In 2014, at the first White House Maker Faire, Chevron announced a \$10 million investment to build 10 Fab Labs in the communities where we live and work. The Chevron-supported Fab Labs include: Grindstone and Waynesburg, Pennsylvania; others in Washington, D.C.; Bakersfield, Richmond and Santa Clara, California; New Orleans, Louisiana; Houston and Odessa/Midland, Texas; and Pascagoula, Mississippi. These labs have served nearly 40,000 people so far.



helping create tomorrow's engineers



\$20 million

committed by the API to regional workforce development

Taking into account some Fab Labs are mobile, Brandon Prentice, a Fab Lab manager, spends countless hours driving the undulating country roads of southwestern Pennsylvania, eastern Ohio and West Virginia bringing STEM to schools, parents and community groups. The mobile lab is made possible by our Appalachia Partnership Initiative (API), which invests in programs that engage students in science, technology, engineering and math in preparation for careers in the region's high-demand occupations. Through Chevron's investment, the API has committed \$20 million to regional workforce development. In addition, launched in 2015, Chevron and Intermediate Unit 1, a regional educational agency, created a permanent Fab Lab in the town of Grindstone and a mobile lab that serves 25 rural community school districts.

"We're educating people in technical literacy to think with their hands, problem-solve in creative ways and apply these lessons to daily life," said Prentice. "The skills we teach appeal to students with different aspirations, who may want to get a GED, go to vocational technical school or go to college."

From 2015 to mid-2017, nearly 4,000 students participated in and 220 teachers were trained at Fab Lab programs in the region. Prentice said the mobile lab visits to communities have inspired the creation of up to 10 maker spaces, similar to Fab Labs, in the region's school districts. The new spaces are available to students as well as community members.

broaderening the reach of STEM education

In the Permian Basin, Chevron supports a Fab Lab and a mobile Fab Lab at Odessa College that opened in February 2017. The vast Permian Basin spans 75,000 square miles in western

Texas and southwestern New Mexico, but the area has only half a million people. Chevron is among the largest producers of oil and natural gas in the region.

"The energy industry is fueling tremendous economic growth in our region," said Odessa College Vice President of Instruction Valerie Jones. "[Fab Labs] bring the skills and excitement to these kids so they are prepared to become the workforce of tomorrow."

Permian Basin Fab Lab Director Cedric Bleimling said the lab serves K-12 and college students to give more people in the remote region a better opportunity to participate and think about what is possible for them and their community. "Right now, we're excited to be building robots, making circuits and designing art for the college library, but I'd love to see us expand our reach into the community, do something like design and build a house and give it to someone in need."

Odessa College students like Autumn Sandoval who participate in Fab Labs believe that STEM programs open doors they never knew existed. "I feel like I'll be more prepared for high-tech jobs that come to our area," said Sandoval.

Chevron is in the business of progress; our investments in STEM education are designed to empower students to do great things that benefit us all. In Odessa, Perryopolis, Grindstone and other places we operate, students are thinking differently about STEM. And one of them just may build a circuit to create the next supercomputer, engineer new ways to power cities more efficiently or find a cure for a deadly disease.



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STEM and girl power

Chevron supports programs to encourage girls to pursue STEM education, for example:

Techbridge Girls, a STEM-focused hands-on learning and mentorship program

EngineerGirl.org, designed to bring national attention to the exciting opportunities that engineering represents for girls and women through essay contests and resources

PLTW Innovation Portal, an online portfolio that enables students to showcase their projects, collaborate with teachers and project mentors, and share their final results with mentors, universities and businesses

Photos

Cover: Project Lead The Way students collaborate on the engineering design process, applying math, science and engineering standards to hands-on projects, like designing a new toy and improving an existing product. **1:** The Intermediate Unit 1 Fab Lab from Grindstone, Pennsylvania, on display at the 2018 USA Science and Engineering Festival, enabled students to experience the excitement of STEM by engaging in hands-on activities. **2:** Project Lead The Way offers students and educators world-class curricula and teacher training to help kids obtain the in-demand, transferable skills they need in order to excel. **4:** The Appalachia Partnership Initiative focuses on 27 counties in Pennsylvania, Ohio and West Virginia. This initiative aims to create multiple pathways for residents to access education, training and career opportunities. **This page:** Techbridge Girls demonstrate chemical engineering at the 2018 USA Science and Engineering Festival by showing attendees how to make slime and lip balm.



additional resources

chevron.com/education

chevronSTEMzone.com

EngineerGirl.org

FabFoundation.org

FuelYourSchool.com

PLTW.org

TechbridgeGirls.org

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