

# The 'Fab Lab'

## The Ariens Co. breaks new ground with Brillion High's exemplary technology and engineering program

BY CHRISTIAN SCHNEIDER

At first blush, Brillion seems like just another pleasant Wisconsin small town. Yet this city of 3,000, 25 miles south of Green Bay, is a unique manufacturing powerhouse, housing four large machine plants: Ariens Co., Endries International Inc., Professional Plating Inc., and Brillion Iron Works. On any given day, more people work in Brillion's four factories than live in the town itself.

Yet the plants aren't the only places where Brillion residents are hard at work. Most days, Brillion's high school students are toiling away in their school's "Fab Lab," fabricating frames for prototype high-mileage vehicles as a part of a statewide gas mileage competition. These students, enrolled in the school's capstone engineering class, are building a "supermileage" vehicle. Last year's entrant was a hybrid that racked up 260 miles per gallon. This year's team is shooting for 300 mpg.

Brillion High School's Science, Technology, Engineering and Mathematics (STEM) program is largely the product of an innovative partnership with the Ariens Co. In 2007, at the behest of school principal Paul Nistler and technology education

coordinator Steve Meyer, Ariens gave Brillion High a \$1.5 million gift to double its STEM classroom space from 5,000 to 10,000 square feet.

Thus began a relationship that Ariens calls a national model for business-education partnerships.



*Dan Ariens sees the high school as his pipeline for quality employees.*

**Ariens Co. was founded in Brillion** in 1933 by Henry Ariens and his three sons, who created the first American-made rototiller. By 1950, the company was manufacturing riding lawn mowers. The 1960s saw the company add snow blowers to its product line. In 1998, Dan Ariens, Henry's great-grandson, took over the company; Ariens now employs more than 1,200 people in Wisconsin, including 200 new hires in 2011.

Ariens' investment in local education has paid off for both the school and the factory. Before the gift, about 60 Brillion High students took technology classes. Since 2007, STEM enrollment has exploded. The program typically has about 200 students in a school of 330 students. Ariens provides both instruction and materials, and the high school reciprocates by producing potential workers experienced in manufacturing and engineering the

## The ‘Fab Lab’

day they receive their diplomas.

“Before 2007, I was thinking about how I keep Ariens Co. staffed with quality people, whether



*Principal Paul Nistler estimates that at least half of the STEM students have relatives working at Ariens.*

they’re technicians on the floor, or engineers, or manufacturing leaders, and my feeder is really Brillion High School,” says Dan Ariens. “So it was really coincidental that Steve and Paul brought me this proposal at the time they did.

“Paul was very engaged and had a vision of what he wanted to do, and Steve is an infectious teacher,” notes Ariens. “He had an energy that convinced me it was going to be a really cool program.”

The school doesn’t see its role as merely providing workers for the factory. “Ariens didn’t give money with the expectation that the school was going to create workers for them,” says Meyer.

But Meyer says that it is no coincidence that Brillion’s companies have remained successful during the economic downturn while so many others have not. It is unique for such a small town to have such large manufacturers, and Meyer believes the quality workforce produced by the STEM program has something to do with it.

### **This success couldn’t come at a better time.**

While manufacturing jobs in Wisconsin have started coming back, there are about 22% fewer factory jobs in the state than the high point of 600,000 in early 2000. The national unemployment rate for workers under 20 years old stands at 21%, and the wage gap between workers with a college degree and those without is at a 48-year high.

Dan Ariens, who chairs the governing board of the powerful business group Wisconsin Manufacturers & Commerce, looks to reset the usual conversation about manufacturing. “A really good manufacturing job — tool and die, machinists, good assembler — is still a very good middle-class wage. And when you take those numbers nationally and look at what it is in Calumet Country versus Milwaukee, New York and Chicago, there isn’t that [wage] gap.”

Meyer points to the program’s greater purpose. “We don’t create just the noun ‘engineer,’ we create the verb ‘engineer,’” he says, emphasizing that the program’s focus is on teaching kids to be creative, to solve problems, and to apply math in real life.

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Nistler notes that Ariens also provides internships in accounting and marketing, so the opportunities aren’t just on the factory floor. Meyer adds: “Our real philosophy is to provide kids with the tools to end up wherever they want to end up. We don’t want to track kids in a certain direction. We don’t promote four-year universities for every kid. We do promote

future training, which can come from apprenticeship programs, technical diplomas, and associate degrees.”

Aside from that initial Ariens grant, the program is entirely funded by the Brillion School District. The company does help out with materials to make car frames and other student projects. And in a new initiative, Ariens engineers visit the school daily to work with students.

“Fifty percent of that program is so our kids can learn from the engineers,” says Meyer, “but the other half is so those engineers can learn from our students, because kids are innovative and have different ways of looking at problems.”

**Meyer is aware that for decades, “shop” class has** carried with it the image of disaffected young men — definitely not college material — hiding out in a corner of the school where females dare not venture. “If you look at a traditional shop class, would that be a place that would be attractive to a young female engineer?” Meyer asks, answering his own question with a “No.”

But Brillion’s STEM program breaks the stereotype that girls aren’t inclined towards math and engineering: Typically around 30% of the program’s participants are female. And Meyer notes that while females may go into engineering careers at a lower rate than males, they learn skills they can take with them into other jobs.

Meyer offers nursing as a “great example” because health care workers need a very technical background. “To be honest, I want nurses to know more about engineering than the guy making my snow blower,” jokes Meyer.

Outside educators have taken note of Brillion High’s success. The school gives about 60 tours a year to visiting teachers who want to see what they can replicate in their own districts. What they find at Brillion High is impressive.

**The school’s “Fab Lab” is flanked by a 58-seat** lecture hall and a design room with 24 computer stations where students can create three-dimensional graphical models. Two Ariens-labeled vehicles built in previous years by students hang above the lab. There are five other rooms where students work on design projects. Meyer says that some student-inspired designs have even been patented by Ariens and sold to the public. (More on that shortly.)

Inside the fabrication room, a handful of students are staying after school to design a supermileage



*Tech ed coordinator Steve Meyer says his program has disrupted the usual high school cliques.*

entry. The project takes students through all phases of building the car, from engineering to fabricating, modeling, prototyping, testing and building — all while learning to work as a team.

(Other lab inventions created include a duck decoy system, a parallel-parking vehicle, a can crusher, a vehicle-lighting system, a guitar trainer, and a livestock feeding system.)

Breaking up the usual high school cliques is an important byproduct of the program, says Meyer. “It may be stereotyping, but we want everyone in, from the valedictorian to the kids struggling to find what they’re really good at. If you get those kids together, which we do, the bar is raised for both. They learn

## The 'Fab Lab'

from each other, and that's exactly how it works in the real world."

In 2013, the school's competitive team, consisting of four girls and one boy, won second place at the Fox Valley Technical College competition and first place at the Road America supermileage competition. The team's one-seat hybrid car averaged 260 miles per gallon over three runs. Six years ago, an all-female team built a pink-trimmed car, took pledges for each mile per gallon and raised \$1,500 for the Susan G. Komen Breast Cancer Foundation.

Senior Rebecca Phipps, a member of last year's award-winning team, says she caught the engineering bug early. "Mr. Meyer told me about an engineering camp in seventh grade, and I never really thought about a STEM career before that. I really liked it, and I started taking a lot of classes right away in my freshman year," she says. Having other girls in the program is a plus, she adds.

Phipps wants to go to Michigan Technological University and major in chemical engineering. Working with chemicals, of course, is different from studying engineering. But both are STEM fields where women are historically underrepresented.

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According to Nistler, around 30% of Brillion's graduates go to technical college while from 50% to 60% enroll in four-year colleges. Others go into apprenticeships or straight into the workforce. Nistler

guesses that at least 50% of the kids in the STEM program have family members working at Ariens.

Dan Ariens says the company hires only a few students every year who move straight from high school to a full-time job. However, according to



*Senior Rebecca Phipps caught the engineering bug in seventh grade.*

Meyer, his kids go work at Ariens "in the hundreds" during the summer, helping out during snow blower assembly season. (Conversely, lawn mowers are made during the winter.)

"A lot of those kids have had our classes and probably make some of the best employees over there because they have a general understanding of what happens at the plant."

**Meyer wants to promote a culture where** engineering is cool; he calls it being "Stemmy." He says he tries to keep community members excited about technical education in the same way they get excited for Friday night football.

His dream to extend STEM education to kids as early as kindergarten was recently fulfilled when the Brillion School Board mandated STEM instruction for K-5 classes, including rudimentary engineering

projects for 5-year-olds.

"Fourth-graders are learning about industrial engineering. Third-graders are doing biomedical engineering, making human prosthetics and wind turbines. Kids can tell you about Newton's third law of motion at age 5, because they're making parachutes and throwing them off the steps," says Meyer, who has installed a modified version of the elementary school curriculum created by the Boston Museum of Science.

So far, K-5 STEM has been a big hit: "I would bet, if I asked 95% of the kids in our elementary school right now what their favorite class was, they'd say STEM," says Meyer.

Yet some have reservations about the Ariens initiative. "Having individual businesses cutting their own partnership deals with public high schools creates a competitive disadvantage for other business owners who do not have the same political influence or financial resources," says Lori Compas of the liberal Wisconsin Business Alliance. She adds that such arrangements might seem too politically "cozy" without a system in place requiring transparency.

Compas said that while the Brillion-Ariens partnership appears to be a successful model, she believes such programs are better implemented through increased funding for public schools and the Wisconsin Technical College System.

Brillion's families are certainly willing to step up to the plate. On April 1, voters approved, by a convincing 59% - 41% margin, a referendum to spend \$2.95 million to convert an old elementary school gymnasium into a STEM lab. This will add around \$20 the property tax bill of a \$100,000 parcel of property.

To Dan Ariens, there is no question how valuable a STEM education is. During a tour of Ariens' main factory, he points to a gas tank the students engineered a year and a half ago in response to

new Environmental Protection Agency regulations aimed at reducing leaks of gas fumes. One of the high school's working groups designed a leak-proof tank, created a computer model and produced a prototype. The tank quickly went to tooling and soon was featured on the company's new line of riding lawn mowers.

"If you want to give your kids an experience they will carry the rest of their lives, then they need to go through a program like STEM," says Ariens. "It's

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**The tech program will give kids 'an experience they will carry the rest of their lives,' says Dan Ariens. 'It's learning, it's experimenting, it's problem-solving.'**

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learning, it's experimenting, it's problem-solving, it's integrating with adults in a work environment.... It's really a holistic experience for 16- and 17-year-olds."

Paul Nistler agrees. He says Dan Ariens sees the big picture, while still tending to the needs of his company: "He obviously wants people to come over and work for him, but he wants people to come out of this program who can work anywhere, too. It's not just 'Send me your kids or else!' He understands how important it is to manufacturing in Wisconsin, or anywhere else, that we are producing those thinkers, those innovators." ■

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