



MANUFACTURING TODAY WI™

Building Wisconsin's Workforce of Tomorrow!

Technical College Apprenticeships

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Teaching technology for everyday lives

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The Technology Education Program at Viterbo University

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Cardinal Manufacturing

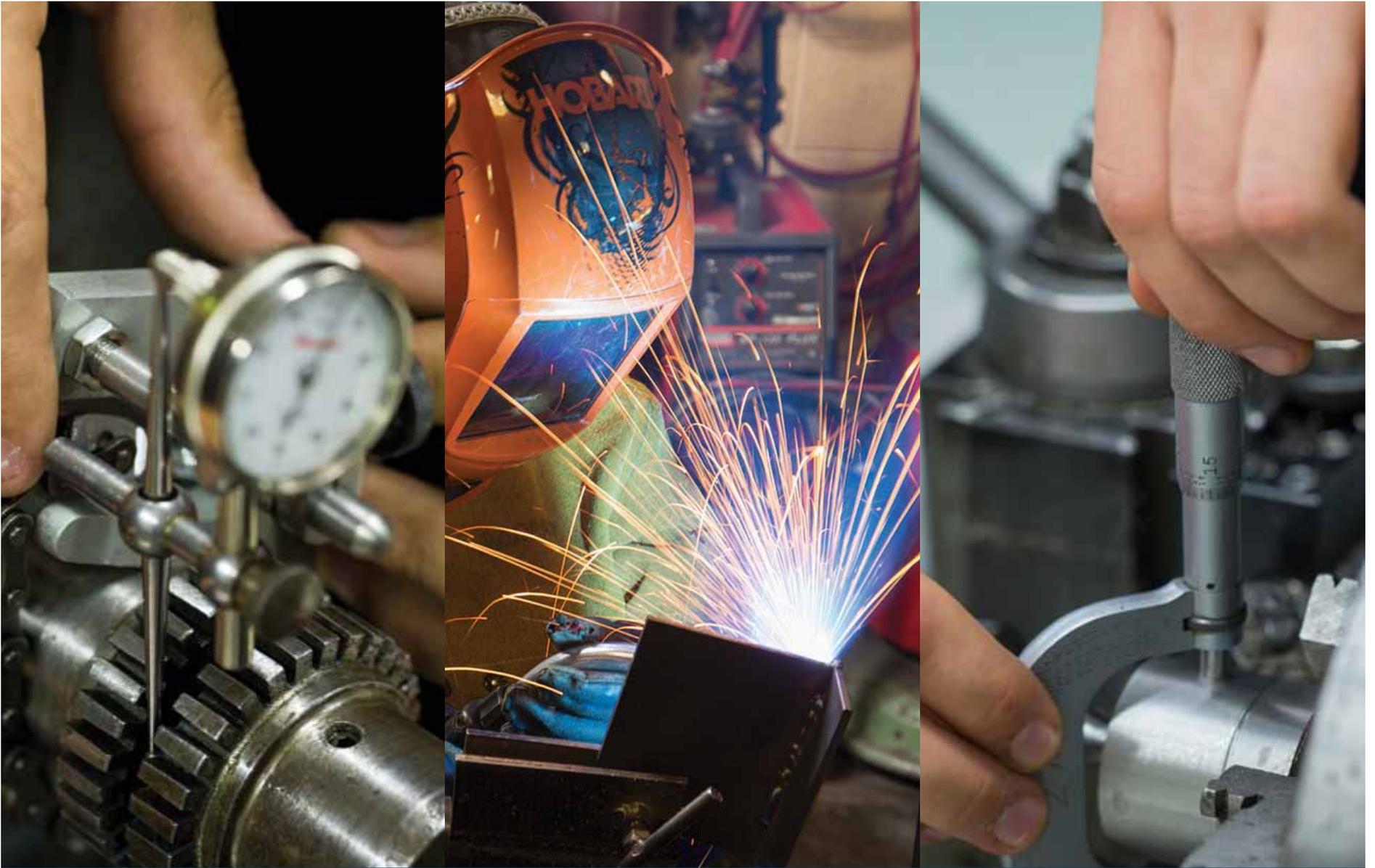
Page 8 — Cardinal Manufacturing has come a long way since it started in 2007. The shop itself has grown in size as well as popularity. Working with industry leaders, Cardinal Manufacturing has added a great deal of CAD software and other equipment. Cardinal Manufacturing provides a great opportunity to learn the soft skills and technical skills in a business atmosphere. When you are receiving a part of the profit you realize how your actions affect the company and ultimately how well the business does.



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Building Wisconsin's Workforce of Tomorrow!

Project G.R.I.L.L. Prepares Students for In-Demand Manufacturing Careers

Page 9 — Johnsonville Sausage is growing and hiring! We will be recruiting new members for technical positions in the engineering and maintenance fields over the next several years. Students can explore the diverse career opportunities available in these fields by participating in Project G.R.I.L.L. The program provides development opportunities for students to hone the technical skills required to be successful in these types of roles.



Red Raider Manufacturing

Page 10 — Red Raider Manufacturing will allow business professionals and educators to continue to create the future through collaborative partnerships that educate students and parents about the great local careers available, and the pathways to find a career that holds importance and value. While there are still issues we face, we have a plan and we have direction. We know that our community will survive because we are talking and we are listening.



LTC-Plymouth Science & Technology Center Trains Students, Adults

Page 12 — The \$1.2 million facility gives Plymouth High School students experience with all phases of the design process, taking projects from conception to completion. They design projects using industry-standard CAD programs, then create three-dimensional models and finally produce and finish projects using high-tech mills and a lathe. They also can learn metal fabrication in a professional welding training facility.



STEM Manufacturing Program at Portage High School

Page 13 — The Portage Community School District will be introducing a new coursework structure for a group of students during the 2016-2017 school year. Portage High School will be embarking on a new STEM Manufacturing program for selected sophomores. The major highlight of the program is that the students will take English, math, and science credits within the technology education and engineering labs.



School District of New Berlin Supporting Students' Interest in Engineering and Manufacturing Pathways

Page 17 — The School District of New Berlin supports students interested in exploring engineering and manufacturing pathways through an intentional variety of programming, co-curriculars and community partnerships. "We're grateful to our local business partners who have provided students with paid opportunities in quality assurance, assembly, testing, automation, data entry and more," said Garza.

N.E.W. Plastics Corp in Luxemburg — A great place to work!

Page 15 — For students currently enrolled in a technical/engineering curriculum, we offer "Intern" positions that pay while you are going to school with flexible hours. One of our benefits is tuition reimbursement and we strive to promote from within. Our dedication shines through with several industry awards, including four Manufacturing All-stars!



Transforming Technical Education

Page 18 — Gleaming floor and freshly painted walls, state of the art industrial equipment with sophisticated software to match -- this is not your father's auto shop anymore. Instead, the Sheboygan Falls High School room once used to teach auto repair and store maintenance equipment has been transformed into the Innovation and Design Fab Lab where students will learn and hone technical skills they can carry from the classroom to the workplace.



Waukesha MADE



Page 18 — The Waukesha MADE program is a great example of a school program that connects the business community with school districts. Waukesha MADE (Manufacturing, Automotive, Design and Engineering) has a planning committee that includes manufacturing partners and representatives from the three Waukesha high schools. Teachers, counselors and principals sit at the same table with plant managers and presidents to discuss the needs of shop classes and what projects would benefit the students.

Technical College Apprenticeships

By Jessica Hehir
Marketing and Public Relations Associate
for WITC

Quanex Building Products are sending their employees to the Millwright Apprenticeship at Wisconsin Indianhead Technical College (WITC) in Rice Lake, WI. This apprenticeship program is one of many offerings this year taking place at WITC.

The Millwright Apprenticeship at WITC-Rice Lake has more than doubled in the last year due to an uptick in Millwright positions. This surge is brought on by increased manufacturing across the state and a phenomenon dubbed the "Grey Tsunami." A massive wave of impending retirements will sweep across the region over the next three to four years.

Employers are proactively planning for this exodus by training their staff to be sure qualified people are in position as retirements occur.

"The Apprenticeship Program" is the best kept secret in the state of Wisconsin," said Burt Mayhak, industrial mechanic instructor for Chippewa Valley Technical College. Mayhak has more than a dozen years of experience as a millwright apprentice instructor at technical colleges across the state of Wisconsin. "A lot of people don't know apprenticeships exists. They don't know they have the opportunity to train people in their own company."

The Role of a Technical College

In 1911 The Wisconsin Technical College Systems (WTCS) was designated as the training place for apprenticeships. The original function of technical colleges was to provide apprentices a hands-on, skilled level of training. WITC founded one year later, in 1912, following the WTCS model. Technical colleges remain the premier training sites for apprenticeships.

"You can show someone how to do something but to explain the skill academically is more difficult," said Steve Miller,

millwright apprenticeship instructor at WITC-Rice Lake. "That requires a different level of training and skill set. That is where WITC steps in."

The differences between an apprentice and an associate degree at a technical college is money. During an apprenticeship, the apprentice is employed while receiving field experience and learning theory paid for by the employer. In Wisconsin, an apprenticeship can include up to 8000 hours on-the-job working with journeymen practicing skills learned in the classroom.

Miller brings 15 years of field experience and 22 years teaching experience to the classroom. This skill-set is a

great resource for companies to tap into. WITC partners with growing and developing companies across the region to assist in high level training and apprenticeships to develop their existing workforce in a competitive marketplace.

"These instructors with their high technical skills can relate to the apprentices while teaching their class with the many things which they may be faced with on the job which are not in the text book," said Randy Deli, divisional dean of continuing education and apprenticeship at WITC. "It is good match."



Technical College and Apprenticeship Cross-Over

The differences between an apprentice and an associate degree at a technical college is money. During an apprenticeship, the apprentice is employed while receiving field experience and learning theory paid for by the employer.

In Wisconsin, an apprenticeship can include up to 8000 hours on-the-job working with journeymen practicing skills learned in the classroom. As well as 576 lecture hours. At WITC those lectures meet for a full day every other week during academic year.

A typical apprenticeship program is completed in four years. Graduates of the program receive 39 practical credits towards their associate degree. This is an incredible bonus for journeymen interested in advancing their degrees while moving up within their industry.

Students travel from as far away as Superior, New Richmond and north or Eau Claire for this particular apprenticeship. These students will be able to network and share ideas and best practices from their employers. This is a unique industry experience afforded to apprentices.

"Getting paid to learn and when you are done it is almost like having a college degree," said Mayhak. "It is that valuable."

That value does not discount the importance of a technical college education. The two learning tracks work together. Some industries require employees to have a two-year associate degree before they enter an apprenticeship. Students do receive credit towards their apprenticeships based on prior learning at a technical college. Employers also give priority to applicants with even some technical college experience.

Completing both an apprenticeship and an associate degree provides opportunity

for advancement and higher earnings. Prior credit for learning ensures highly skilled labors are on the job while efficiently using employer and employee time.

State Curriculum with Industry Flexibility

The state curriculum breaks down to 80% core related training with an additional 20% flexibility to meet local industry needs. For example, this year Miller will incorporate an electrical component to the Millwright Apprenticeship for the students from Quanex Building Products.

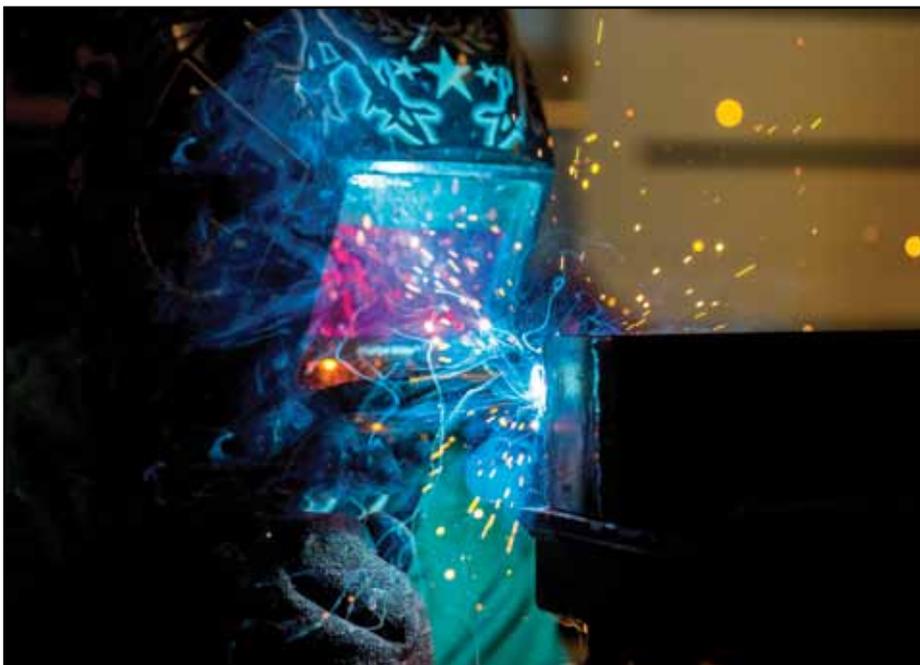
Under the WTCS system a company will contract with the closest technical college able to meet local demands. "They get the best people they can to teach the apprenticeship," said Mayhak.

The 80% rule also protects journeyman. The standardized training makes each journeyman valuable in the workforce. Employers can be confident hiring an applicant with a journeymen status.

"In this role, will be working with people that are actually in industry that are motivated because of their job," said Miller. "This will be a dynamic classroom situation."

Companies interested in installing an apprenticeship through WITC should contact Margie Ince on Rice Lake (715) 234-7082 extension 5289 or Margie.ince@witc.edu or Randy Deli at 715-234-7082 extension 5113 or randy.deli@witc.edu

"Apprentice is training reinforced by theory and on the job training experiences" and "Apprenticeships works," said Deli quoting both WTCS and Workforce Development.



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Kimberly Area School District

Kimberly High School's Technology Education Teachers are preparing their students for careers in manufacturing by teaching relevant curriculum that exposes students to processes and expectations they will see when they enter a job in the machining or welding field. All projects incorporate and expose students' valuable skills and experiences they will experience in industry.

Whether college bound or ready to join the workforce after their high school years, Kimberly's educators are giving their students the tools and education that will serve them well in the future.

Kimberly High School offers three metals/machining classes that students can take in order to gain skills and knowledge.

The skills specific to machining include proper setup and operation of a milling machine and lathe to produce a part that falls within specific tolerances. Additional skills in the metals shop include proper set up and operation of sheet metal equipment, hand tools and basic SMAW welding equipment to produce a project that falls within specific specifications.

Once students learn basic skills and machine setup and operation the teacher becomes a facilitator or resource to students as they apply their skills to projects throughout the metals courses they take. As the students advance to higher level metals and machining classes the learn



more advanced lathe and milling machine techniques to create more advanced and elaborate projects.

One example of an advanced process is CNC milling. The students learn to write the code that the CNC machine needs to operate. They enter the code into the machine and it produces the part with amazing accuracy.

Kimberly has three additional welding specific classes the students can take. Skills learned specific to welding include proper set up and operation of SMAW, GMAW and GTAW welding processes.

In addition to proper set up and operation of the equipment students fine tune their individual welding skill to be able to produce high quality welding beads and projects using all three processes.

The third level welding class at Kimberly is a dual credit class. The class is the GMAW Techniques 1 course which college students take when they get to the tech

school. The same class is offered at Kimberly for dual credit. If students get a B or higher in the class at the high school they get the GMAW Techniques 1 credits for free and do not need to take the course at the technical school if they decide to enroll in the welding program. This gives students advanced knowledge and experiences while still in high school.

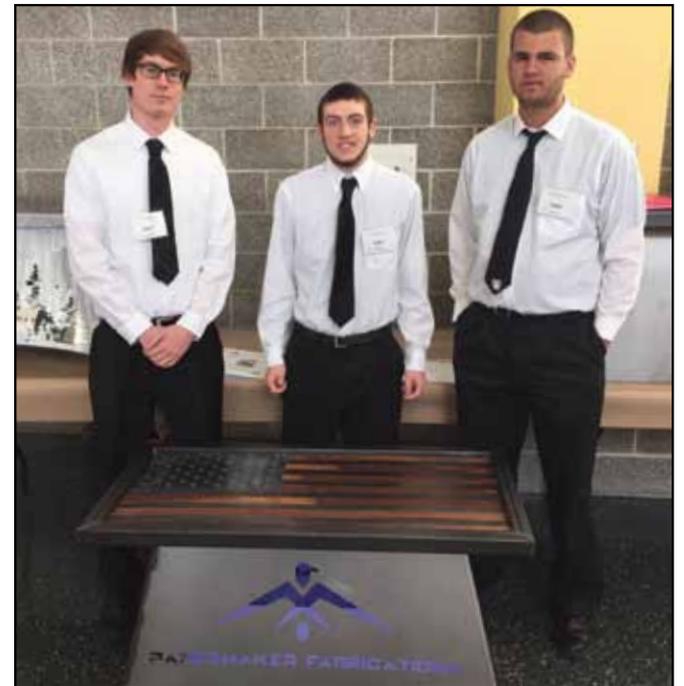
In both Metals and Welding students learn the skill of reading blue prints properly. They are expected to interpret blue prints to create class projects and are also expected to create their own personal blue prints to design and build a final project. Blue prints must be aligned to specifications and requirements that prints in industry are held to. Students are expected to produce projects independently and use problem solving skills taught in class to work through problems they might encounter.

These are by no means the only classes available in Technical Education. Other options include communication-digital media classes, construction classes, and engineering.

Kimberly has many partnerships with area businesses. Businesses support our program in many ways. They donate material students can use to practice machine operating techniques and build projects. In addition, businesses offer job shadow and youth apprenticeship opportunities

for our students. Students gain valuable experiences by visiting a business for a job shadow. They actually see the work environment and what their job could be like in the future. Youth apprenticeship opportunities are even more beneficial because students get the opportunity to work for a machining or welding company before they graduate. All of this helps them make confident decisions about future schooling and career pathways.

Students compete in SkillsUSA competitions throughout the year in their desired career interest area. Student have won multiple metals in both the welding and machining contests. The welding fabrication team took first place at the state contest in Madison. The students advanced to represent Wisconsin in the National welding fabrication contest in Louisville, Kentucky June 20th through the 25th. Students did not place in the top three at nationals. However, they gained valuable industry related experiences.



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The Technology Education Program at Viterbo University



The Viterbo University Technology Education program is a joint program between our university and Western Technical College both located in La Crosse, WI.

All technology education students must complete the Core Curriculum (Basic Studies) courses, education courses (including student teaching), and general technology courses as prescribed by W.T.C. Technology education students also select a technical emphasis from one of the following areas: Engineering/Manufacturing, Graphics/Communications, Power, Energy, and Transportation, Construction/Woods, or General Technology.

Tech ed undergraduates can complete the program in eight semesters with some needing a ninth semester to student teach. Each student is unique. Technology education students range from new freshmen, to transfer students from another four-year school, to those who have completed or partially completed a technical college



degree. The latter two types of students have credits that transfer into our four-year program. Some of our technology education students have had real-life experience that may then be translated to credit for some required technology courses.

All of our technology education graduates who want jobs, have jobs. In the last year, two of our graduates have had school districts competing to hire them. One district actually offered to buy out the newly signed contract of a tech ed pre-service teacher who is still completing his student teaching. The need for technology education teachers is great!

Educating Future Leaders

Earn your Technology Education teaching degree at Viterbo University

Viterbo's NCATE accredited and Wisconsin DPI approved Technology Education teaching degree and licensure program prepares teachers for leadership and success in the classroom. Coursework includes the use of a variety of teaching techniques to help students learn and develop skills related to a specific occupation or career in the areas of:

- Manufacturing/Engineering
- Construction/Wood
- General Technology
- Graphic Communications
- Power, Energy, and Transportation

Viterbo also offers a post-baccalaureate teacher licensure program in technology education for those individuals with a non-education college degree that want to enter the teaching profession.



For more information contact admission@viterbo.edu, call 608-796-3010 or online at www.viterbo.edu/teched

Cardinal Manufacturing

Colin Nyseth

Senior, Eleva-Strum Central High School
Production Manager, Cardinal Manufacturing

Nestled between the towns of Eleva and Strum, Wisconsin is Eleva-Strum Central High School, home to the Cardinal Manufacturing program. Cardinal Manufacturing is a student-run, custom manufacturing company where students run all aspects of the business. We employ student marketing managers, student office managers, student production managers, student engineers, student machinists, and student welders.

When a job comes in, the production manager gives the details to the engineer, who then gives a drawing back to the production manager. The production manager then gives the job to the welder or machinist, who completes the job before the deadline. When completed, the product is shipped to the customer and invoiced by the office manager. Although this is common practice in a business setting, the true power of Cardinal Manufacturing is that all tasks are carried out by high school students.

Cardinal Manufacturing gives these individuals hands on manufacturing experience in a real world application. Students are treated as employees, getting paid profit sharing at the end of each year. This program is a self-sustaining business, so we get a higher-level, practical education at no extra cost to the school district.

To obtain a position in Cardinal Manufac-

turing you first have to create your resume and go through an interview process, much like applying for a real job. Besides being able to make money, students learn business skills and the technical skills required for a job in manufacturing. The class's main focus is to instill soft skills within students, as these skills are transferable to any career choice. With input from outside employers, teacher Mr. Cegielski focuses the class around creating good people and good employees first, knowing the technical skills will follow. In addition to teaching soft skills, Mr. Cegielski also helps students set short and long term goals that coincide with larger shop goals.

Cardinal Manufacturing provides a great opportunity to learn the soft skills and technical skills in a business atmosphere. When you are receiving a part of the profit you realize how your actions affect the company and ultimately how well the business does. Also, you get to experience real deadlines; not completing the job on time not only means earning a bad grade, but also the loss of money and maybe the customer.

Cardinal Manufacturing has come a long way since it started in 2007. The shop itself has grown in size as well as popularity. Working with industry leaders, Cardinal Manufacturing has added a great deal of CAD software and other equipment, including a CNC lathe and two brand new Haas CNC milling machines. We have received a lot of media attention, including two



episodes on the *Titan American Built* television show. We have also benefited from publications like *Manufacturing Today WI*, *Modern Machine Shop*, and several others. They have all helped to draw attention to the program and spread the word to other schools and industries that this model of education is working here and can work anywhere in the country. Because of this, we have held several workshops for other schools on how to replicate a similar manufacturing program in their own districts.

We are extremely happy with where the Cardinal Manufacturing program is currently, but also have big plans to continue to improve and expand the program in the future. We continuously strive to teach technical and employability

skills at the highest possible level while we learn in a real life-manufacturing environment.

For more information, pictures and video visit our website at cardinalmanufacturing.org.

Cardinal Manufacturing hosts workshops at least twice per year. If you are interested in attending to learn more about how to replicate the program, our next Cardinal Manufacturing Workshop is on Jan. 20, 2017.

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Project G.R.I.L.L. Prepares Students for In-Demand Manufacturing Careers



Growing Readiness In Learning & Leading

Johnsonville Sausage is growing and hiring! We will be recruiting new members for technical positions in the engineering and maintenance fields over the next several years. And we're not alone. Many Sheboygan-area companies anticipate adding skilled manufacturing positions and we are working together to build the talent pipeline to fill these critical roles.

Students can explore the diverse career opportunities available in these fields by participating in Project G.R.I.L.L.

Project G.R.I.L.L. (Growing Readiness

in Learning & Leading) is a partnership between schools and Sheboygan manufacturing companies to promote in-demand technical jobs to educators and parents. The program also provides development opportunities for students to hone the technical skills required to be successful in these types of roles.

The 30-week program pairs high school students with local manufacturers to design and build a custom, functional grill from scratch. Students gain hands-on academic and technical competencies associated with engineering and manufacturing skill sets. The students also experience the full range of production from project management, design and fabrication to finishing, assembly, quality and testing.

In addition to Project G.R.I.L.L., Johnsonville also provides many other learning opportunities to students interested in pursuing a manufacturing career, such as:

- The Youth Apprenticeship Program, a partnership with Lakeshore Technical

College that integrates school-based and work-based learning to provide academic and occupational skills to students. Youth Apprentices work at least 450 hours for Johnsonville while earning high school and college credit.

"We believe in lifelong learning," said John Schwantes, director of member services at Johnsonville's operations facilities. **"That means we're committed to helping every single member develop their talents to reach their full potential."**

- The internship program, which allows college students the opportunity to work full-time hours during the summer, between their college semesters.

- Job shadowing, which allows students to gain first-hand knowledge of the skills and competencies required to perform certain jobs.

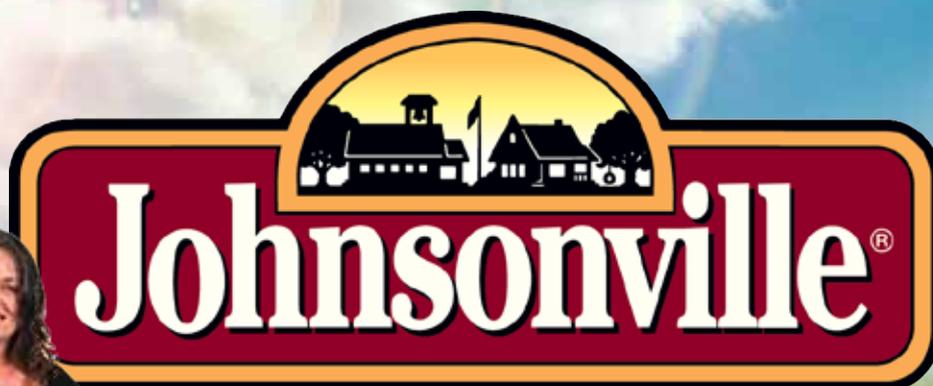
- Continuing Education programs, which provide tuition reimbursement for members who are pursuing their degrees while working at Johnsonville.

"We believe in lifelong learning," said John Schwantes, director of member services at Johnsonville's operations facilities. **"That means we're committed to helping every single member develop their talents to reach their full potential."**



Visit jobs.johnsonville.com to learn more about our unique culture, "The Johnsonville Way," and check out available job opportunities. You can also visit project-grill.org or inspiresheboygancounty.org to learn more about these programs.

**At Johnsonville Sausage,
people are the heart of our business.**



We don't have employees or managers. Instead, we have members and coaches. That's because we use our business to build our people; not the other way around. It's this belief held by Owner and Chairman Ralph C. Stayer that has helped Johnsonville grow from a small butcher shop to the nation's number one sausage brand, from breakfast to bratwurst.

Visit jobs.johnsonville.com to learn more about our unique culture, "The Johnsonville Way," and check out available job opportunities.

We value the diversity of our workforce and we embrace the principles of Equal Opportunity Employment (M/F/Vet/Disability). Johnsonville values the service Veterans and their family members have given to our country. We support the hiring of returning service members and military spouses.

Red Raider Manufacturing



REDRAIDER MANUFACTURING

Sheboygan Area School District

Paul V. Griffin, Johnsonville Sausage

Communication is the foundation for human interaction. It defines our realities and perspectives about life and the world we live in. Through conversation, we have the opportunity to share and learn from each other and create partnerships that construct our culture.

Red Raider Manufacturing, at its core, is built on conversations. There are two components to having a conversation. The first is what most people are good at, talking. We love to hear ourselves talk. We love to be right. We often struggle with difficult conversations or conflicting ideas. One thing is certain, though, we will talk about.

This leads to, what could be considered the most critical component of communication, listening. Listening is often difficult, because it means we may have to be vulnerable with our own thoughts and perspectives.

For instance, at a Sheboygan County Chamber of Commerce Business and Education Partnership committee meeting in 2013, the subject of skills gaps, generational issues, retirements, turnover and lack

of technical resources raged rampant among our conversations. School and business leaders were faced with perplexing needs to grow the capabilities of their institutions to support the local economic needs. Many times, there were conflicting ideas around who was responsible for developing the workforce. Was this

the schools responsibility, or was it the businesses?

While a nationwide projection of workforce imbalance loomed, local manufacturers faced challenges for recruiting, developing and retaining employees with technical knowledge and skills, while also selling the idea of making manufacturing an appealing or desirable career. The issues Sheboygan County faced could be detrimental to the economy if handled incorrectly. The Sheboygan County economy is

Perhaps most impressive, is the fact that local manufacturers, businesses and organizations invested in the Red Raider Manufacturing idea and partnership, providing over \$4.8 Million in funding to build new technology education centers at both Sheboygan North and South High Schools."

vastly based on a manufacturing infrastructure, and without it, fear of a domino effect to other businesses and a collapse in the economy was, and is, a legitimate concern.

During one of these meetings, I asked the question to Principal Mike Trimberger from Sheboygan South High School, "What are you doing to provide the technical skills we need?" Mr. Trimberger responded by saying, "What do you want me to do?" As simple as it sounds, this statement led to further conversations between the manufacturing and education community, which proposed the idea of holding a "Develop a Curriculum" (DACUM) event. While this



was only one of many other conversations occurring around the same time, it helped establish and build the idea that we were in this together, we were on the same team, and we were going to listen to each other.

Since the DACUM event, the Red Raider Manufacturing partnership has continued to build momentum. The high school technical education curriculum was updated with the assistance of Lakeshore Technical College, to produce and encourage the

skills needed for success in today's manufacturing sector. The curriculum was built to provide programming around technical and mechanical skills, while also providing a pathway to work-based

learning opportunities, such as Youth Apprenticeships and co-op's. The output has provided students opportunities to learn about organizational culture and career options. Students can now explore multiple technical careers, earn college credit, and get paid for life-defining experiences.

Perhaps most impressive, is the fact that local manufacturers, businesses and organizations invested in the Red Raider Manufacturing idea and partnership, providing over \$4.8 Million in funding to build new technology education centers at both Sheboygan North and South High Schools.

The official Grand Opening of the Kohler and Johnsonville Advanced Technology Centers will be held on October 18, 2016 at Sheboygan South High School. On Saturday, October 22, 2016, Sheboygan North High School will host an open-house and the first annual Sheboygan Manufacturing & Technology Fair for the community. The 12,400 square foot additions, housing state-of-the-art manufacturing and engineering technology, will open to students at North and South High Schools this fall.

This event will celebrate years of work and dedication between education and business partners.

While the technology centers provide additional opportunities for students to learn practical application, the combination of industrial tools and resources with a solid technical education curriculum provides opportunities for additional integration of local business partners, such as, guest speakers, project-based and problem-

Red Raider Manufacturing will allow business professionals and educators to continue to create the future through collaborative partnerships that educate students and parents about the great local careers available, and the pathways to find a career that holds importance and value."

based learning, and overall, experiences that are meaningful and career-focused for students, educators, business partners and parents.

Red Raider Manufacturing will allow business professionals and educators to

continue to create the future through collaborative partnerships that educate students and parents about the great local careers available, and the pathways to find a career that holds importance and value. While there are still issues we face, we have a plan and we have direction. We know that our community will survive because we are talking and we are listening.

To learn more about Red Raider Manufacturing, please visit the websites below.

[www.sheboygan.k12.wi.us/
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By Jamie Piontkowski
Communications Coordinator
Plymouth School District

Plymouth High School students and community members are better prepared for a number of engineering and technical careers, thanks to the LTC-Plymouth Science & Technology Center.

"The facility allows us to provide a higher level of curriculum," said PHS technology education instructor Greg Gritt (the 2015 Tech Ed Career Pathmaker Award winner). "We are teaching the students a lot more application, using many different skills to perform tasks that they would not have been able to use before."

The \$1.2 million facility gives PHS students experience with all phases of the design process, taking projects from conception to completion. They design projects using industry-standard CAD programs,

then create three-dimensional models and finally produce and finish projects using high-tech mills and a lathe. They also can learn metal fabrication in a professional welding training facility.

Students in *Project Lead the Way* classes can earn college credits, and several vocational programs carry credits from facility partner Lakeshore Technical College. Engineering classes are taught by science and technology education teachers, all of whom are certified by *Project Lead the Way*.

The state-of-the-art equipment in the facility allows students to collaborate with local businesses. For example, students from the Introduction to Engineering & Design and the Computer Integrated Manufacturing classes worked with a local manufacturer to print parts using the school's three-dimensional printer, which the manufacturer then used to develop prototypes for its clients. In return, the company brought its portable FARO Arm to show students how the coordinate-measuring device provides highly accurate measurements and quick reverse engineering.



Many benefit from center

PHS technology and engineering students aren't the only ones to experience what the facility has to offer. LTC offers classes for adults in the evening; especially popular is the Welding Basics & Beyond course, which includes extended practice with welding and cutting systems. Eighth-graders tour the facility each year, before they select their freshman classes, with hands-on activities in many of the labs.

Second-graders from neighboring Horizon Elementary School as well as Cub Scouts toured the facility earlier this year and assembled a wooden game (which had been designed on a CNC machine by a PHS student). The youngsters also tried their hands at screen printing; using a laser engraver; taking apart an engine in the automotive lab; watching a welding demonstration; and using Photoshop to alter their own photos. The activities were set up by Greg Gritt, Jake Sherman and Beau Biller but conducted by PHS students, who served as the teachers for the day.

Outside the classroom

PHS students can supplement what they learn in class by participating in the PHS Technology Education and Engineering Club, one of about 60 extracurricular offerings at the high school.

The club takes on different projects each year. One recent example is Project

Grill. In 2014 PHS was paired with a local manufacturer to build a trailer, two grills and a food preparation station for use by Three Guys and a Grill, the first time a team in the competition had an actual "client." The competition requires a grill capable of cooking 10 brats at once; this one can handle 350.

"This was a real-world example of taking a project from conception to completion, and was a great extension of the concepts and goals we cover in our classes daily," Mr. Sherman said of the Project G.R.I.L.L. experience. "Also, we hope students learned valuable soft-skill lessons such as time management, sacrifice, meeting deadlines, attention to detail, quality of work, public speaking, presenting and overall work ethic."

Community collaboration

The center came about thanks to a partnership involving Lakeshore Technical College, the Plymouth School District, the City of Plymouth and area businesses. Work began in the fall of 2010, and was largely completed in time for the beginning of the 2011-12 school year.

More than half of the initial cost of the \$1.2 million project was covered by a grant from the U.S. Economic Development Administration. The city of Plymouth provided an additional \$250,000 in economic development funds; LTC and the school district contributed \$280,000 in in-kind donations.



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STEM Manufacturing Program at Portage High School

Robin Kvalo
Principal, Portage High School

The Portage Community School District will be introducing a new coursework structure for a group of students during the 2016-2017 school year. Portage High School will be embarking on a new STEM Manufacturing program for selected sophomores. The major highlight of the program is that the students will take English, math, and science credits within the technology education and engineering labs. The core classes will be infused with technology education projects and our new "Enterprise"; our in-house manufacturing business experience. The current core teachers will be sharing the classroom with technology educators-teaming up for academic success for these individual students.

The daily structure will look like the following: the students in the STEM program will have their normal coursework throughout the morning. However, in the afternoon, they will be in the STEM manufacturing area where they will take their English course. After lunch, the students will come back to the lab and have science and math. Finally, at the end of the day, students will utilize resource time to work on individual employability certificates as well as the Enterprise.

The English portion of the STEM program will revolve around communication needed both

in the workplace and the "Enterprise" business that the students will develop. For example, students will create procedure sheets, resumes, work orders, and a variety of documentation that is used in industry every day. Moreover, local business and industry will be available to create mock interviews with the students. Although the English portion of the STEM program is not team taught, a technology educator will be available for collaboration during this time.

After returning from lunch, students will be in the Physical science portion of the STEM program. The instructors will reinforce the physical science standards that students will need in both the technical school and the trades. Many of the science standards will be reinforced by classroom labs and then applied in the "Enterprise" extension of the program. The science portion of the program will be team taught between a science and technology education teacher.

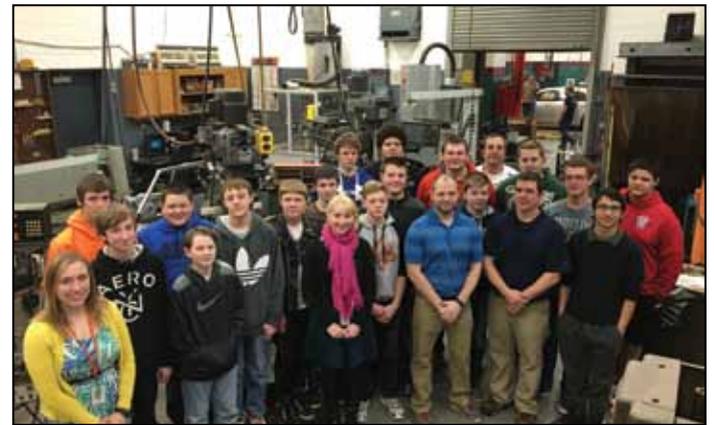
Finally, the math portion will be delivered during our seventh period with both a technical education instructor and a math teacher. The math curriculum centers around both machine tooling math and other concepts needed in the manufacturing "Enterprise" experience.

So, why offer a new STEM program at Portage High School? The answer is twofold. First and foremost, we see a need for a specific population of students. Certain students have found success in our technical education

department, but have not found the same success in his or her core classes. Therefore, by exposing the students to direct connections to the trades and manufacturing, we feel the students will find motivation and understanding to succeed in all content areas. As a result, confidence grows within the students and a sense of the whole big picture starts to emerge.

Secondly, our school district wants to continue to build partnerships with our community and local industry as part of its five-year strategic plan. Our STEM teachers have talked to local businesses and manufacturers. We have heard the concerns in regards to what skill sets the current new employee base is lacking. As a result, we want to bridge that gap and help teach the skills that will lead to individual successes in the workforce. With this model, individuals will be able to earn specific workforce/trades certifications and youth apprenticeship opportunities along the way.

We are confident the "Enterprise" model is a step in the right direction to meet the needs of



our students and the lack of skilled employees in the current market. By allowing these students to be a part of something bigger than themselves and having the opportunity to develop the skills that current employers are looking for in a manufacturing setting, the stage is set for kids to continue to find success in a career he or she chooses.

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- Biofuels Processing Technicians
- Biological Engineers
- Biological Technicians
- Career and Technical Education Teachers
- Cargo and Freight Agents
- Chemical Engineers
- Chemical Equipment Operators and Tenders
- Chemical Plant and System Operators
- Civil Engineering Technicians
- Computer Programmers
- Computer User Support Specialists
- Database Administrators
- Electrical Engineers
- Engine and Other Machine Assemblers
- Environmental Science and Protection Engineers
- Financial Quantitative Analysts
- Forest and Conservation Technicians
- Industrial Engineers
- Industrial Machinery Mechanics
- Industrial Safety and Health Engineers
- Information Technology Project Managers
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- Hydroelectric Plant Technicians
- Logistics Analysts
- Logisticians
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- Mechanical Engineers
- Medical and Clinical Laboratory Technologists
- Medical Equipment Repairers
- Medical Scientists
- Nanosystems Engineers
- Nuclear Engineers
- Nuclear Power Reactor Operators
- Occupational Health and Safety Specialists
- Outdoor Power Equipment and Other Small Engine Mechanics
- Paper Goods Machine Setters, Operators, and Tenders
- Precision Instrument and Equipment Repairers
- Robotics Engineers
- Robotics Technicians
- Sawing Machine Setters, Operators, and Tenders, Wood
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- Shipping, Receiving, and Traffic Clerks
- Software Developers, Applications
- Soil and Water Conservationists
- Statisticians
- Telecommunications Line Installers and Repairers
- Textile Cutting Machine Setters, Operators, and Tenders
- Tool and Die Makers
- Transportation, Storage, and Distribution Managers
- Water/Wastewater Engineers
- Welders, Cutters, Solderers, and Brazers

Please note: This represents a broad and not conclusive list of careers within the world of manufacturing.

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N.E.W. Plastics Corp. started in business over 50 years ago. We are a medium sized manufacturing company located just 15 miles east of Green Bay in Luxemburg, WI. Our company was founded in 1968 by Irvin Vincent and ownership has passed to his two sons, Lynie and Vern. Today we are a vibrant progressive plastics manufacturer employing over 200 team members with 3 different manufacturing plants in 2 states.

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- **RENEW Plastics** — extruded plastic lumber and components

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be done. But in 1973, mere months after starting, Irvin revolutionized the building industry when he developed the very first recycled plastic lumber. We have been engineering new products ever since. To this day, RENEW Plastics has been a leading innovator mastering plastic recycling technology to deliver unmatched wood-alternative lumber and engineered-composite decking across North America and beyond.

At VBS Total Packaging we live up to our name. We supply a full-line of packaging materials including glass, plastic, aluminum, pails, tubs, tubes, metal tins and flexible packaging. We provide our customers with one supply source, for an efficient, coordinated packaging supply. A professional hair care company came to us for packaging assistance with their newly developed hair relaxer product. We were able to assist them by supplying them the complete package needed. Applicator brushes, mixing trays, gloves, spatulas, instruction sheets and point of purchase displays came in on time and on budget to meet their packaging and launch deadline!

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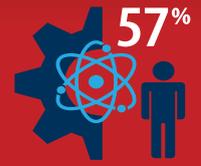
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School District of New Berlin Supporting Students Interest in Engineering and Manufacturing Pathways



School District of New Berlin

Last April, three prominent Waukesha County manufacturing companies hosted facility tours for 24 School District of New Berlin high school students interested in exploring manufacturing and engineering careers. The tour event is a key part of SDNB's annual College and Career Readiness Event Seribes which helps inform the students' high school course selections and post-secondary planning.

The tours were arranged through the Waukesha County Business Alliance's *Schools2Skills*™ program, an initiative designed to give young people a first-hand look into the innovation and advanced technology happening across manufacturing companies here in Southeastern Wisconsin.

"On behalf of the Waukesha County Business Alliance, we have been pleased to offer this program to Waukesha County students for the past 5 years. These students are

at an important stage where they can begin to explore the myriad of career opportunities available to them. *Schools2Skills* gives them the chance to learn that manufacturing isn't dull, dirty and dangerous, but clean, safe and high tech. Besides, there's nothing cooler than knowing something you worked on is helping people around the world," said Eric Huemmer, WCBA Public Relations & Communications Coordinator.

The students learned that Wisconsin leads the country in manufacturing, consistently ranking #1 or #2 among all states while contributing 19.6% to our state's gross domestic product. Seventeen percent of the state's workforce is directly employed in manufacturing.

Professionals at each location shared their role at the company, their individual employment stories and the unique pathway each of them took to get to the position they are in today. They also dis-

cussed the employability skill set that they look for when filling a wide range of positions within their organizations. Workers who are self-motivated problem solvers, great communicators, collaborators, and life-long learners have a place in manufacturing.

"Today's industry tour of three of the leading manufacturers in Waukesha County is a great example of the type of partnerships that are critical to our district. Our students benefit from the chance to learn about a variety of career possibilities and what it takes to secure those positions. The insights gained through these tours are invaluable as students continue to plan and prepare for their future," said SDNB Superintendent, Joe Garza.

The day concluded with a tour of Waukesha County Technical College's School of Applied Technologies. The students visited equipment labs for WCTC Dual Enrollment Academy programs in metal fabrication and welding, tool and die/CNC, and printing and publishing. They also toured areas for electronics, architectural drafting, electrical and construction engineering and robotics.

The School District of New Berlin supports students interested in exploring engineering and manufacturing pathways through an intentional variety of programming, co-curriculars and community partnerships. The district offers a full course progression in PLTWay Engineering

and Design coursework. Also offered is an Introduction to Manufacturing course that exposes students to a variety of careers in the manufacturing industry and provides the opportunity to earn MSSC Certifications that can set a student apart as they transition to post-secondary pursuits.

Additionally, students with an interest in manufacturing can enroll in coursework through WCTC's Dual Enrollment Academy which gives them the chance to earn 20-24 WCTC credits, including an industry credential, by the time they graduate high school. Co-curriculars such as Robotics and the BUILD Vintage Motorcycle Racing Team, as well as opportunities for

work-based learning placement at local businesses, enrich the student experience exponentially. "We're grateful to our local business partners who have provided students with paid opportunities in quality assurance, assembly, testing, automation, data entry and more," said Garza.

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Where Careers are MADE



Eric Huemmer
Public Relations & Communications
Coordinator
Waukesha County Business Alliance

The Waukesha MADE program is a great example of a school program that connects the business community with school districts to ensure what is being taught in school is applicable to modern careers. Introduced and coordinated by the Waukesha County Business Alliance, this program is a collaboration between manufacturing partners and the School District of Waukesha to raise awareness about industry careers and area businesses that offer those opportunities.

Waukesha MADE (Manufacturing, Automotive, Design and Engineering) has a planning committee that includes manufacturing partners and representatives from the three Waukesha high schools. Teachers, counselors and principals sit at the same table with plant managers and presidents to discuss the needs of shop classes and what projects would benefit the students. It also allows manufacturers and engineers to inform the schools what skills they are looking for in new employees and what processes students should be learning.

The manufacturing partners for Waukesha MADE help develop projects for high school students to get involved within classrooms and at their facilities. One such project involved pipe test stands needed by one of the manufacturers. The company gave students at Waukesha North High School the drawings for the stands, the students made some revisions to the drawings, and then fabricated the stands on the equipment at the business's shop.

The program also allows the business partners who are seeking to financially support

the schools to have a say in how those funds are used. Instead, the partners can help examine the current needs of the engineering and manufacturing classrooms and suggest what the money is used for to stay relevant. Schools then stay up-to-date with what machines and processes manufacturing are using today.

Waukesha MADE also allows business partners and schools to better connect on apprenticeships and co-op opportunities. Welcoming CNC operators, welders and engineers into the classroom gives students the chance to meet with experts in those fields – fields that students might want to explore further. Discussions about possible next steps then take place at an organic level, less driven by counselors and more by classroom interactions.

The Waukesha County Business Alliance also works with the Waukesha MADE program to host activities and events that can promote the appeal of these careers to students who may not have considered manufacturing. One of the most successful events that has come about through the partnership has

been a career fair at the Waukesha County Technical College, where 700 students spoke with 30 different companies from automotive, graphics and manufacturing and engineering companies about the career opportunities in the county.

As the program continues to be successful in Waukesha, the Waukesha County Business Alliance has been looking into creating a working template to bring it to other school districts in the county. Waukesha County is home to a strong manufacturing base, with one in five jobs being manufacturing-related. Connecting its manufacturing members with school districts addresses the growing skills gap that these industries are facing today.

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Transforming Technical Education

Mary Lofy
Director of Instruction
School District of Sheboygan Falls

Gleaming floor and freshly painted walls, state of the art industrial equipment with sophisticated software to match — this is not your father's auto shop anymore.

Instead, the Sheboygan Falls High School room once used to teach auto repair and store maintenance equipment has been transformed into the Innovation and Design Fab Lab where students will learn and hone technical skills they can carry from the classroom to the workplace.

"This is not a single faceted room," said Ed Hughes, the Sheboygan Falls High School technology education teacher who has spearheaded development of the new space. "This is a general purpose facility with highly technical equipment that students will use to build STEM (science, technology, engineering and math) related projects."

The lab was created in part because of a push by the district to incorporate more hands-on, project-based learning into the curriculum, not just in the technology education area but across all subject areas and grades. This deepens students' understanding of academics and develops critical thinking skills that are crucial to preparing them for post-high school education and careers that require higher technical skills than ever before no matter what the field.

The addition of the lab will allow the high school to offer a Computer Aided Design and Engineering class this fall for the first time. Other engineering classes will be added

later. Students taking the STEM Geometry class will also be using the equipment in the lab. And members of the county-wide robotics team, which is hosted by Sheboygan Falls, will be using state of the art robotics equipment to build their projects.

One of the highlights of the lab is a 33 ton plastic injection molding machine — that comes to the high school through a partnership between the district and a local manufacturing company. According to the manufacturer of the machine, this is the first time this type of unit has ever been used at the high school level.

Scott Kuehn, technical talent acquisition coordinator for the company, has worked with the Sheboygan Area School District on their technical education program but that focused primarily on training students in specific skills -- like welding -- and did not include any training in plastics. So he asked Sheboygan Falls to consider adding that element to its revamped technical education lab.

By learning to use the injection molding machine, students will not only learn how to make plastic parts but will also be exposed to other skills such as material management and hydraulics.

Hughes has successfully applied for grants to underwrite the cost of purchasing some of the software and other items needed for the equipment in the lab.

Sheboygan Falls has partnered with other county manufacturers as well. Kuehn said there are currently well over 2,000 manufacturing jobs open in Sheboygan County.

High school principal Luke Goral says



he is excited about the partnership with local manufacturers that the Fab Lab represents as well as the opportunities it creates to expose more students to a wide range of skills and possible careers.

"We definitely see the need not just in this county but in the nation for workers with these skills," he said.

The Fab Lab and its equipment may eventually be open not just to high school students. District officials may invite middle school students to use the space for some of their projects. And Kuehn said his company might consider using the space for one-on-one training of employees after school hours.

Kevin Dulmes, facilities manager for Sheboygan Falls, oversaw efforts to physically prepare the space for its new use. He notes

that without the business partnerships the Fab Lab and the opportunities it represents would never have been realized. In addition to its other assistance, Bemis is setting up another expensive piece of equipment that the district purchased through grant money but could not afford to get up and running.

"That is a sizable investment that small school districts couldn't afford," he said. "This would not have happened without the help of the local businesses. The financial impact on the district was very low."

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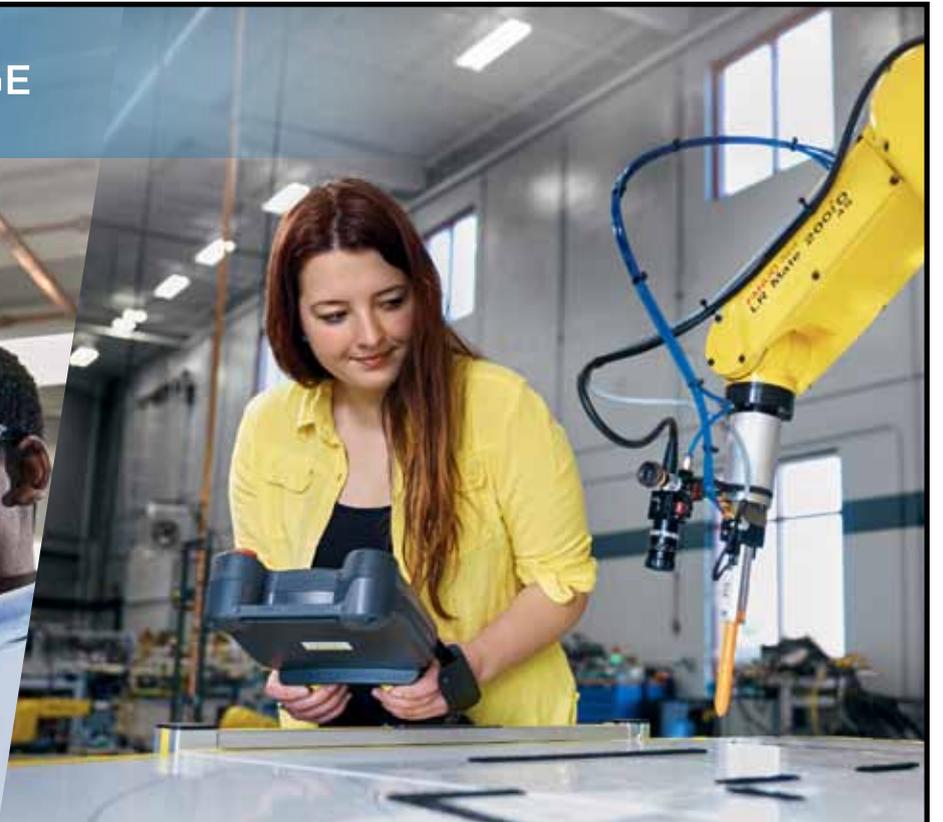
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