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MANUFACTURING TODAY WI™

Building Wisconsin's Workforce of Tomorrow!

Education with the Skills that American Manufacturing Needs

Page 5 — Four years ago, the Chetek-Weyerhaeuser High School Technology Education Department set out on a mission to overhaul their technical education department. Since the renovations to the technical education curriculum and department were completed, students, teachers, and administration have worked closely with local manufacturing companies to develop graduates with the knowledge and technical skills to help fill the needs of the local industries.

Northwoods Manufacturing

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Plymouth Tech Ed Students Put Core Skills into Action

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Arrowhead's Design Engineering Manufacturing Center

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Building Wisconsin's Workforce of Tomorrow!

STEM Program at Portage High School

Page 9 — The Portage Community School District introduced a new coursework structure for a group of students during the 2016-2017 school year. Portage High School embarked on a new STEM Manufacturing program for selected sophomores. The major highlight of the program is that the students take English, math, and science credits within the technology education and engineering labs.

Sheboygan Falls Transforming Technical Education

Page 9 — Gleaming floors 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 Design Center where students will learn and hone technical skills they can carry from the classroom to the workplace.

Partnerships Build Careers in Manufacturing

Page 12 — Moving into the 21st Century has meant that Kaukauna High School has built on a record of success in establishing careers in Manufacturing and Engineering. Partnerships with local manufacturing firms allow students to apply their learning in Youth Apprenticeships. . In the last three years KASD has leveraged grants and other assistance to remake the image of our manufacturing technology classes.

A-Tech Prepares High School Students for the World of Work

Page 12 — If you've ever heard a student ask "When will I ever use this in real life?" you already understand the need for Appleton Technical Academy (A-Tech). Students learn practical skills that get applied to real-world situations. A-Tech was created in response to a need for workers to fill the growing demand for skilled manufacturing positions in Northeast Wisconsin.

Hustisford Tech Ed — Husty Heavy Manufacturing

Page 18 — The Hustisford Tech Ed program is going strong! Here are updates to our classes and the HHM (Husty Heavy Manufacturing) as written by the students in these classes. Girls are becoming more involved in tech-ed. There are several different ways to attract more ladies to the shop. I believe the most important aspect is to get the girls excited about it! It's honestly a fun experience, and girls need to be informed about that.

Slinger High School Manufacturing: Above and beyond with real world experiences

Page 15 — The manufacturing classes at Slinger High School strive to offer relevant curriculum and rigorous learning activities that are emphasized through hands on experiences. Students within the program are inspired to discover their interests, talents, and career aspirations while utilizing modern equipment to aid them in solving real world problems that are presented to them through the close relationships that SHS has established with local industry partners.

MANUFACTURING TODAY WI

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WITC Promises FREE Tuition for Area High School Graduates

A New Opportunity for High School Seniors

When: Application Open. Deadline April 14, 2017

Location: Superior, Ashland, Rice Lake and New Richmond.

The WITC Promise Scholarship, funded by the WITC Foundation, provides free college tuition for area high school graduates who meet program eligibility requirements. The WITC Promise Scholarship will pay the balance of tuition and fees for eligible students after federal and state grants are applied. Tuition will be covered up to four terms (pending eligibility requirements each term).

"The WITC Foundation Board is pleased to support and fund this important college initiative. We know the college's graduates are in high demand and the WITC Promise will give the opportunity to more individuals to attend WITC who otherwise might not have been able to afford to enroll," said Charlie Singler, WITC Foundation Board President.

"Because WITC has so many courses and programs that transfer to four-year degrees, the WITC Promise will make it even easier for local high school graduates to save money by beginning their education at WITC," said WITC Vice President of Student Affairs Steve Bitzer.

Who is eligible for the WITC Promise Scholarship?

- 2017 high school, GED or home schooled graduate
- Apply for admissions to a financial aid eligible program at WITC by April 14, 2017
- Complete and submit the Free Application for Financial Aid (FAFSA) by April 14, 2017
- Complete and submit WITC Promise Application by April 14, 2017
- Student must meet eligibility requirements for Federal and Wisconsin financial aid
- Complete all program admissions requirements prior to July 1, 2017
- Have an Expected Family Contribution (EFC) of $3,500 or lower as determined by information provided on the Free Application for Financial Aid (A student's EFC is an index number of how much financial aid the student is eligible to receive; it is not the amount of money a student will have to pay for college, nor is it the amount of student aid a student will receive.)
- Achieve minimum 2.0 GPA for senior year in high school
- Participate in a free Financial Literacy training program while enrolled at WITC
- Enroll in at least 12 credits per term (exception to minimum credit requirement may apply for certain programs)
- Complete the WITC Foundation Scholarship application for all future terms

For more information, prospective students can call 800.243.9482 and ask for an admission advisor or visit www.witc.edu/foundation/witc-promise.

The WITC Promise Scholarship is funded by the WITC Foundation.

WITC is grateful to all our community partnerships. Your support of the WITC Foundation is essential to student success. For information on how to contribute, visit www.witc.edu/foundation/giving.

A nationally top-ranked college and a designated 2016 Military Friendly ® School, WITC serves te educational and career needs of more than 25,000 residents of Northwestern Wisconsin each year. With multiple campuses, WITC offers career-focused associate degree programs, technical diplomas, short-term certificates, customized business training, and a wide array of courses for personal or career enrichment. WITC is a member of Wisconsin Technical College System and is accredited by the Higher Learning Commission (www.ncahlc.org). For more information, call 800.243.WITC or visit witc.edu. WITC is an Equal Opportunity/Access/Affirmative Action/Veterans/Disability Employer and Educator.

Cardinal Manufacturing

Learning is the main focus of the Cardinal Manufacturing program at the Eleva-Strum School District. Since 2007, Cardinal Manufacturing has been providing exceptional education opportunities for students to build professional, problem solving, and career skills. The program also was designed as a localized way to address the skills gap in advanced manufacturing and to engage our students in meaningful education. We are exposing students to the potential of manufacturing-related careers, sharpening their technical skills, and instilling the soft skills and professionalism that employers crave.

Essentially, Cardinal Manufacturing is a student-run machine shop. When you hire Cardinal Manufacturing for your machining, welding, or fabrication project you are helping teach valuable life skills while in return receiving a quality fair-priced product.

Cardinal Manufacturing is made possible because of the support of many groups, businesses, organizations and individuals. The ongoing support has benefitted many students and our regional economy, as well. As an organization, Cardinal Manufacturing extends its gratitude to the Eleva-Strum School District and the many individuals, businesses, and organizations who have contributed to the success of this program.

Cardinal Manufacturing Workshop

Each year many teachers and administrators contact Cardinal Manufacturing with the desire to learn about the program and how to create something like it in their own school districts. Cardinal Manufacturing is a school-based enterprise, a real student-run manufacturing business.

This one-day workshop will provide you with a guidebook, hands-on opportunities, and firsthand experience with an existing and successful program. You will learn about how Cardinal Manufacturing began and the steps that have taken place since then to grow it to where it is today. Meet student employees, learn about administrative concerns and management, see our facilities, meet some of our business partners, and feel inspired to create your program. Not only will you learn about our program, but you will have the opportunity to work one on one with our administration, service providers, and business partners to help begin drafting a work plan you can put into motion right away. Space is limited to 25 participants and we expect the program will fill to capacity early.

Cardinal Manufacturing Workshop for School Districts
Wednesday, June 21, 2017
8:00 a.m. to 3:00 p.m.

All events will take place at the Eleva-Strum School District
W23597 US Hwy 10
Strum WI 54770

Lunch will be provided as well as snacks and refreshments throughout the day. Each participating school district will leave with a complete guidebook. All materials needed for the workshop will be provided. Dress comfortably. Safety wear is not required for this workshop.

To sign up go to:

cardinalmanufacturing.org/for-schools

cardinalmanufacturing.org
(715) 695-2696 ext 2032

www.esschools.k12.wi.us
(715) 695-2696

Education with the Skills that American Manufacturing Needs

Chetek-Weyerhaeuser Area School District

Four years ago, the Chetek-Weyerhaeuser High School Technology Education Department set out on a mission to overhaul their technical education department. At that time, almost one third of Chetek-Weyerhaeuser's graduating seniors had no plans to continue their education after high school. To better prepare CWHS students with the skills and education that the current American manufacturing industry needs, the technical education curriculum, shop and equipment received a complete upgrade. Now nearly four years later, students are reaping the benefits as they prepare for the transition to post-secondary life.

Since the renovations to the technical education curriculum and department were completed, students, teachers, and administration have worked closely with local manufacturing companies to develop graduates with the knowledge and technical skills to help fill the needs of the local industries. Those partnerships have led to a number of new and exciting opportunities that will allow students to get a head start on life after high school.

In December, the CWHS technical education department received an $8,500 grant from the Gene Haas Foundation. The funds can be used for student scholarships, SkillsUSA, and NIMS industry certification testing. The Foundation's goal is to introduce students to careers options in the machine tool and manufacturing industry. Two years ago, CWHS purchased a Haas TM1-P CNC machining center. Without the generous support and educational discounts offered by the factory retailer, a small school like CWHS would be unable to purchase such a piece of equipment.

Regional and local partnerships have also yielded great success. A company near Chippewa Falls, and another in Chetek have continued to offer scholarships for any student wishing to continue their education in the machine tool industry. CWHS currently has one former graduate working at the Chetek facilities. He received a scholarship from them and will graduate from a technical college machine tool program this year.

This is the second year of Chetek-Weyerhaeuser's manufacturing youth apprenticeship program, which has grown from one student in its inaugural year to four this year. Two students are working at a local company that manufactures food-processing equipment sold world-wide. These two individuals are gaining vital real-world experience machining and welding stainless steel

products. A local Chetek manufacturer of aluminum docks and a custom machine shop, has stepped up to hire one of CW's students as a youth apprentice aluminum welder. Another business located in Bloomer, manufactures commercial exhaust systems as well as other custom welding fabrication; they, too have hired a youth apprentice for their welding production line. These apprenticeship programs continue to expand and have grown in popularity. They offer students real-life, paid work experience while providing them with technical skills and knowledge. The program also allows a student to try out an occupation before making a decision about the direction of their post-secondary education.

The SkillsUSA chapter is now in its seventh year at CWHS. The chapter is stronger than ever with 25 student members. The students have competed in many events and

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Northwoods Manufacturing

Jacob Hostettler
Technology Education Teacher
Hurley High School

Northwoods Manufacturing is a student-run business where students learn how to develop a good work ethic, do advanced machining on metal and wood, and enter into the workforce in a manufacturing career. Northwoods Manufacturing was made possible when Hurley High School's technical education department underwent a complete overhaul. With support of the industrial partners, the school purchased manufacturing equipment. Students helped by building new welding tables, repainting the walls, and redoing the floor. The goal of Northwoods Manufacturing is to provide students with real world manufacturing experiences that will prepare them to enter the workforce with production skills and work ethic to make them desirable candidates for industry.

Northwoods Manufacturing is in its fourth year of operation, and has seen some new improvements over the years since the beginning such as the addition of more digital read-outs for the lathes. Improvements have also been made on the mills with the purchase of power feed for the axes, KURT work-holding vices, and even a new mill from SHARP. Northwoods also has a Browne & Sharpe coordinate measuring machine for precise quality control, and other new measuring tools. Another change to the program since the start is teaching the National Institute of Metalworking Skills curriculum. There are around 15 students that are certified in various levels of the NIMS credentialing system.

Student work and partnerships with local industry has increased since its start, seeing business in specialty parts for the paper and mold industries, and is beginning to make parts and tools for the community. Northwoods has also expanded its business from machine tool operations into welding and fabrication by creating custom trailers, bike racks, and even a lightweight, aluminum framed, ice shack.

With the start of 2017, students from Hurley and surrounding areas have started their first year in the FIRST Robotics competition. Through the help of local industries, students are shown engineering practices and programming to build their own robot. The Northwoods Manufacturing shop is a great place for the construction and development of the robot, with all the necessary resources and help required.

Looking into the future, Northwoods plans to move their operations to a larger facility, purchase another CNC mill, and more fabrication equipment. Northwoods also plans to continue the NIMS Certification curriculum with the goal of certifying 70% of all students with at least 4 level one certifications. One of Northwoods Manufacturing instructors Jacob Hostettler also hopes to add community education classes to the program.

www.hurley.k12.wi.us
northwoodsmfg.org

Plymouth Tech Ed Students Put Core Skills into Action

The 20 technology education courses at Plymouth High School provide students in engineering classes as well as those learning skilled trades with extensive hands-on applications of lessons learned in core classes.

Most of the classes take place in the LTC-Plymouth Science & Technology Center, which features CNC mills, a plasma cutter, a 3-D printer, a welding training facility, engineering/CAD Labs, and a modern automotive lab. This state-of-the-art facility allows PHS students during the day and college students in the evenings to gain experience with all phases of the design process, taking projects from conception to completion.

Core Connections

The PHS technology education program draws on skills learned in all core classes, especially math, science and English.

"Students use the following math skills in tech ed: problem solving, basic arithmetic and measuring, computation and formula solving, angles and trigonometry, and shapes and geometry," said PHS math teacher Jack Daniels.

As part of their master's degrees' action research project, Mr. Daniels along with math teacher Darren Munson and automotive technology instructor Beau Biller researched the need for better collaboration between technology and math education. As a result, a pair of semester-long College Technical Math classes through a nearby technical college were developed.

"The new tech ed math classes will cover algebra and geometry topics with an emphasis on how these concepts are used specifically in CTE fields," Mr. Daniels said. "CTE math applications will play a large role in the coursework."

The classes will emphasize solving technical problems by using mathematical skills. Topics for the first class will include linear equations, graphing, percent, proportions, measurement systems, computational geometry, and right triangle trigonometry. Topics for the second class will include polynomial expressions, rational equations, systems of equations, and oblique triangle trigonometry.

Both classes was designed for technical college-bound students and those interested in applied technical extensions of algebra and geometry. The classes follow the course outcomes required by the college, and students can earn advanced standing or possibly three credits from them for successfully completing each class.

PHS also offers an Applied Communications course for seniors interested in auto technology. This half-credit course teaches communications skills centering around four major projects that largely focus on clearly conveying specialized automobile knowledge to the average person. Learning takes place as part of the two periods of the auto tech class.

In addition, PHS recently added Theatre Design and Technology, a semester-long course taught by drama teacher Janet DeJean Newton and local theater professionals. Thanks to involvement in the PHS spring musical, participants gain hands-on experience in the technical areas of lighting, sound, sets, props, makeup, and costume design and construction.

Workplace Readiness

All PHS technology education classes provide invaluable preparation for careers in engineering, manufacturing and transportation. In addition to the classes above, students also can position themselves for such careers by pursing the following opportunities at PHS:

- **Project Lead the Way engineering classes:** The first in the area to offer this nationally recognized curriculum that relies on hands-on, project and problem-based courses, PHS offers six PLTW courses.
- **Metal welding:** Due to the popularity of its semester-long Metal Welding &

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Arrowhead's Design Engineering Manufacturing Center

Arrowhead Union High School District

Arrowhead has been making inroads at getting students trained for the next generation of manufacturing with their design engineering and manufacturing center. Laura Myrah, the superintendent of the school district, has been at the forefront of creating the center.

"Arrowhead has had a strong engineering program for years and what we've heard and what we've learned is that those students may be highly skilled in engineering and problem-solving and thinking skills, but they don't necessarily understand the hands-on, "how do we make" the product. So, the curriculum has been designed to include both. There's the problem-solving, the thinking, the creativity, but the students also then have to go make that product. The design engineering manufacturing centers are actually the culmination of a couple of years of work with Arrowhead staff, partnered with business partners," said Laura.

Arrowhead committed, in 2015, $2 million for completely renovating and updating the current South Campus Tech Ed facilities. These renovations were completed in the fall of 2015.

The 10,000 square foot facility includes two engineering labs, one manufacturing lab, one design lab, and one innovation lab. Designed to replicate modern manufacturing and engineering environments, the space incorporates natural light and features design elements to promote flexibility, integration and collaboration.

An educator of over twenty-five years, Technology and Engineering Teacher and Department Coordinator, Tom Whelan has some advice for school boards and technical colleges looking to help create talent pipelines from high school to the work force.

"Help market to the school boards and the community members, and help them understand how important it is. For our school, in particular Arrowhead, to be so-called college-bound is what most people have an indication of what we do. For our school board to take this on, that's pretty powerful. We really had the idea that our community and our school board wanted to have this manufacturing component because they saw the need for it."

But a project like this also requires partnerships with local businesses who need to get involved and provide feedback.

Director of Learning, Sue Casetta said, "In the 2013-14 and 14-15 school years, the school engaged in a manufacturing steering committee which invited many businesses to get involved in providing feedback to the district on direction for curriculum and helping us understand the skills gap that exists. I encourage businesses to reach out to their local high school directors of learning, superintendents, and say "We're really interested in partnering with your high school in some way. What would be the variety of ways that we would have opportunities to do that?"

Each year, Arrowhead has about 400 to 500 students working through their design engineering and manufacturing center. And it's only a matter of time until we begin to reach the goals that Laura strives for.

Our vision is to develop learning experiences that will spark interest in engineering and manufacturing for our students. In turn, we help foster our regional economy and begin to close the skills gap with graduates who motivated, interested and appropriately skilled. Our celebration would not be complete without thanking the business partners who have donated equipment, time, money and materials to our program. Without these important partnership, none of this would be possible.

www.arrowheadschools.org
(262) 369-3611

Education with the Skills that American Manufacturing Needs

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continue to see success. Students have taken first place medals this year in the Welding and Job Skills Demonstration contests. The club has also had many top-three finishers. As students compete they showcase their strengths, but they also discover their deficits, which forces adjustments to the curriculum to make sure the content being taught matches the skills that industry needs.

In the spring of 2016, CWHS graduated the first three students earning American Welding Society SENSE Level I welding certificates. CWHS is one of the only high schools in the state to graduate students from the SENSE program. Only students who complete all of the advanced welding courses have the opportunity to earn a certificate, and not all students who take the classes will become certified. It is a very rigorous process that involves passing several written tests as well as performance welds using multiple welding processes. One of our graduates from last year actually chose to forgo basketball and other traditional high school activities his senior year in order to attend technical school welding classes through youth options. This student has now completed his one-year welding degree and has also passed his pipe welding certification.

All of these opportunities have been integral for CWHS students as they transition into their post-secondary life and have given them a head start to their success in the industry.

www.cwasd.k12.wi.us
(715) 924-2226

Plymouth Tech Ed Students

Continued from Page 6

Plasma Cutting introductory class, PHS is adding an Advanced Metal Welding and Fabrication class to allow students to enhance their welding skills, including practice certification tests, print reading, layout work and fixturing. Learning is done in the professional welding training facility at PHS, which features state-of-the-art booths and a plasma cutter.

- **Computer Numeric Controlled (CNC):** Numerous courses provide exposure to CNC operations and programming. Students can fabricate objects designed with CAD software in the 3-D printer and the CNC mills and lathe.
- **Youth Apprenticeship:** This year-long opportunity is available to juniors and seniors. Wisconsin's Youth Apprenticeship Program integrates school-based learning and work-based learning to provide youth with academic and occupational skills leading to both a high school diploma and a Certificate of Occupational Proficiency. This program combines academic and technical instruction with mentored on-the-job learning that makes a real world connection for the students. This program is open to juniors and seniors, and students may apply in February. Students must maintain good grades in school, work for at least 450 hours in a year, achieve required work skills, and meet high school graduation requirements in order to complete the program.
- **PHS Technology Education and Engineering Club:** Participants work on projects in all aspects of the design process and in some cases compete against area schools. Activities include Formula High School, High Mileage Vehicle, Project G.R.I.L.L., Beat the Heat, Ice Fishing, and Manufacturing Job Co-Op as well as community project opportunities. This year's major project is a Formula High School car.

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STEM Program at Portage High School

Robin Kvalo, Principal
Portage High School

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

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

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

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

Finally, the math portion is 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.

www.portage.k12.wi.us
(608) 742-4879

Sheboygan Falls Transforming Technical Education

School District of Sheboygan Falls

Gleaming floors 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 Design Center where students will learn and hone technical skills they can carry from the classroom to the workplace.

> The center 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.

A ribbon cutting and open house event took place on Thursday, October 13. Guests included the State Superintendent, Sheboygan County lawmakers, and members of both the Sheboygan County Chamber and Sheboygan Falls Chamber Main Street. One Congressman, who serves on the Education Committee, shared that he wanted to bring all of the Congressmen to Sheboygan Falls to see what the district was offering to students.

"This is not a single faceted room," said Ed Hughes, the Sheboygan Falls High School technical 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 center 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 center will allow the high school to offer a Computer Aided Design and Engineering class next 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

Continued on Page 14

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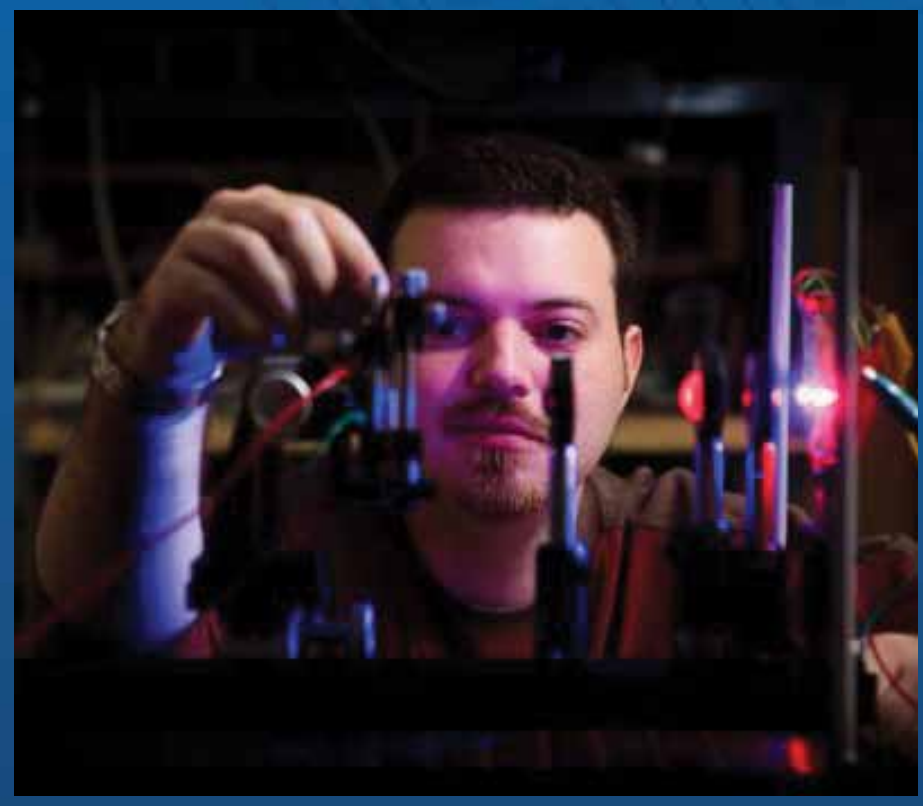
WHAT IS UW-PLATTEVILLE COLLABORATIVE ENGINEERING?

UW-Platteville in partnership with UW Colleges provides the opportunity to pursue an ABET-accredited bachelor's degree in electrical or mechanical engineering from UW-Platteville.

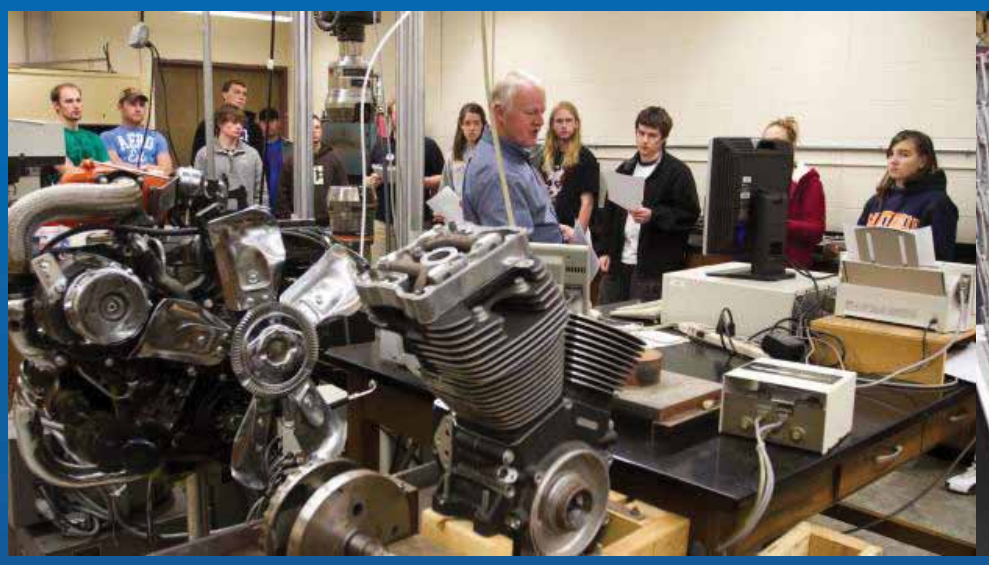


HOW DOES IT WORK?

Students complete the associate degree requirements and pre-engineering courses at one of the 13 UW Colleges campuses or through UW Colleges Online.

While working towards an Associate of Arts or Science degree, students begin taking the UW-Platteville engineering courses by distance technology or in a face-to-face classroom depending on the student's location.

The UW-Platteville engineering courses offered through distance technology are recorded during live classes and then made available via UW-Platteville's online course management system, Desire2Learn.



HOW IS UW-PLATTEVILLE'S COLLABORATIVE ENGINEERING PROGRAM UNIQUE?

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UNIVERSITY OF WISCONSIN
UW Colleges

A-Tech Prepares High School Students for the World of Work

Appleton Area School District

If you've ever heard a student ask "When will I ever use this in real life?" you already understand the need for Appleton Technical Academy (A-Tech). Students learn practical skills that get applied to real-world situations, such as math skills to determine the proper angle for a specific laser cut or weld, writing skills to prepare a standout cover letter and resume, and science skills to understand the chemistry behind the materials they're working with. Each student's education track is tailored to his or her interests, resulting in more individual attention.

A-Tech was created in response to a need for workers to fill the growing demand for skilled manufacturing positions in Northeast Wisconsin. The manufacturing environment in the region is strong and growing. Additionally, as more and more baby boomers retire, businesses are finding it increasingly difficult to find qualified workers to replace the retirees.

In cooperation with the local technical college and business leaders, this Appleton Area School District (AASD) charter school is focused on providing serious students with the skills needed for a successful career in advanced manufacturing and industrial technology.

Greg Hartjes, A-Tech Administrator says that "By partnering with the technical college and local industry leaders, the Appleton Technical Academy provides students with an engaging high school experience. This experience not only earns students a high school diploma, but it also gives them the knowledge and skills needed to be college and career ready."

Using a project-based, hands-on learning approach, the school day features a mix of manufacturing related courses (Welding, Machining, Mechanical Design, Automated Manufacturing) and a mix of traditional core classes (Math, Science, English, Social Studies).

A-Tech labs are second-to-none with brand new equipment that mirrors what the students will see in industry. We have eight welding booths with 16 welders that will expose the students to MIG, TIG and stick welding. We also have six new lathes and four new mills with digital readouts. Our fabrication equipment includes a CNC plasma cutter and numerous metal forming pieces of equipment that will allow students to create meaningful projects.

Students in A-Tech learn about the world of work in a variety of ways. In the classroom they are exposed to the basics of machining, welding, mechanical design, automation, math for the trades, reading blueprints, project-based learning, and other classroom experiences designed to reflect the world of work.

A-Tech appreciates the involvement of manufacturing professionals making classroom presentations and demonstrations and businesses opening their doors to allow students to tour their production facilities and to do job shadows with experienced workers. We partner with the Fox Cities Chamber of Commerce, Fox Valley Tool and Die, Great Northern Corporation, many other area manufacturers, a manufacturing alliance, and the technical college.

Our students benefit from attending A-Tech in a multitude of ways. They get to learn what a career in manufacturing is really like. It's like taking a test drive before buying. They could make money while learning, Seniors enrolled at A-Tech have the opportunity to complete a paid internship for school credit.

A-Tech students can earn nearly one-third of the college credits needed to receive an associate's degree at the college (the equivalent of about one year and about $3,000). A-Tech graduates gain advantage over other applicants entering the workforce. They'll already have hands-on experience in a variety of trades and skilled labor, making you attractive to potential employers. Paul Lindberg, Lead Teacher says that "As an instructor what is extremely rewarding is having graduates return to us after graduation and expressing the benefits of what they learned while in A-Tech."

www.aasd.k12.wi.us
(920) 832-6161

Partnerships Build Careers in Manufacturing

Nels Lawrence
Technology & Engineering
Youth Apprenticeship/CO-OP Coordinator
Kaukauna Area School District

Moving into the 21st Century has meant that Kaukauna High School has built on a record of success in establishing careers in Manufacturing and Engineering. Partnerships with local manufacturing firms allow students to apply their learning in Youth Apprenticeships. Over 45 students are in Youth Apprenticeship this school year. Employers are contacting KHS weekly looking for new talent to fill the demand for high skill high pay positions in manufacturing requiring the school to provide relevant skills for students.

In 1999 the new high school campus opened with much of the equipment from the old school which dated back to the end of WWII. This equipment no longer exists in the manufacturing world of today. In the last three years KASD has leveraged grants and other assistance to remake the image of our manufacturing technology classes. The clean well-lighted work areas surprise visitors and evoke pride among students. The doors open on 4 new Tormach Machining Centers which are fully programmable with tool changers. The row of new DRO Lathes (digital readout) holds industry standard tolerances giving students real life experience. The work spaces are 5S organized to mirror industry standards. The weld area has all new and current technology for GMAW, FACW, as well as plasma arc systems.

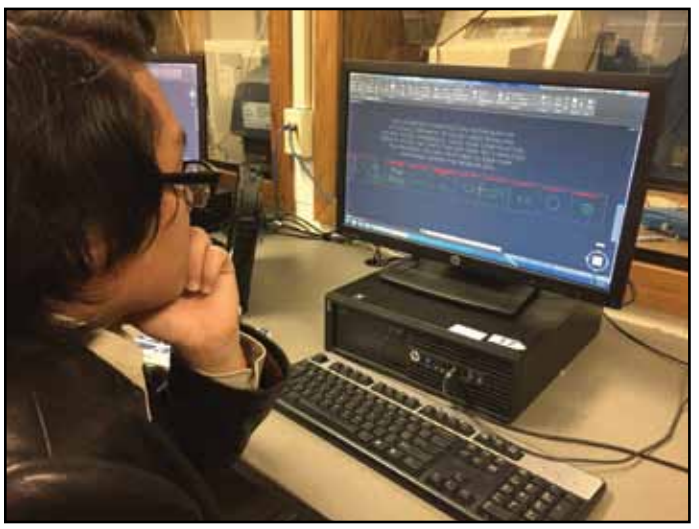
Students earn dual credit with the local technical college for Lathe Work, Measurement and Bench work, SolidWorks CAD, Embedded Systems, Programmable Logic Controllers, PC Hardware and Networking. The core areas at KHS have also gotten on board with Technical Math and English as dual credit classes. These required classes plus the array of choices help student choose careers, and to start college ahead on credits. Mary Hansen, Director of K12 Partnerships at the college reported that "Kaukauna lead the region last year in dual credits with 427 students who earned $201,371 in free credits. " This combination also helps explain the success of the KHS Youth Apprentices.

Not every job in industry today is a hands-on position. While many students do trade apprenticeships after graduation or attend a Technical College, the numbers of students entering engineering careers continues to grow at KHS. Some Youth Apprentice STEM placements are still manufacturing but at the engineering level. This year KHS Teacher Nels Lawrence piloted CAPP Engineering 101 in partnership with a nearby university. Students pay a reduced tuition for 2 college credits toward their Engineering Technology degree program. The university started their engineering technology program two years ago in response to the demand in the strong manufacturing so important to the Fox Valley Region. This class will be featured at the WTEA convention as an option for schools across the state.

Change requires high commitment on the part of the teachers. Kevin Otradovec and Craig Sackmann both completed the factory training program with Tormach to learn the complexities of running a class with modern CNC equipment. They will also attend a spring machine tool program designed especially for them by the technical college. The support of local manufacturers and the college makes a career path work for KHS students.

www.kaukauna.k12.wi.us
(920) 766-6100

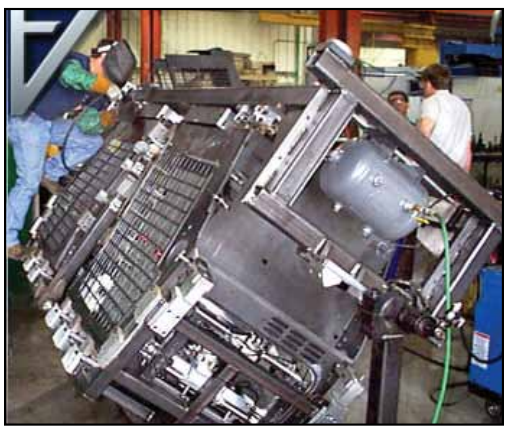
Fox Valley Tool & Die



Fox Valley Tool & Die is a 50-year-old precision job shop employing over 180 skilled craftspeople. Many of these employees started their tenure at FVT&D as high school students. We specialize in the design and build of metal stamping dies and robotic weld fixtures, build to drawing machine components, and high production stamping. These are all challenging careers with very rewarding earning potential, providing one is willing to learn by experience as well as by book, and willing to work with their hands in conjunction with their head.

To begin a dedicated career path in manufacturing while in high school offers a number of benefits. In the skilled trades, experience is the best teacher and you never stop learning. So, the earlier you start, the more time you have to gain. Applications for these jobs have been accepted from 9 different area schools providing opportunities to enter the metal working trades as well as other office support staff positions. Quite commonly, upon high school graduation the student will continue their training at one of the excellent area technical colleges while working part time at Fox Valley Tool & Die. When technical school education is completed, they are ready for full time employment and for the real intense on the job training to commence. The next step will then be a Wisconsin State Indentured Apprenticeship. Depending on the trade, this will entail an additional 4-5 years of on the job training supplemented with increasing more complex studies at a technical college.

FVT&D has been a Partner of A-Tech since it was only a plan on paper. Chartering as a manufacturing school, enables A-Tech to offer a more technical oriented curriculum at the high school level, while providing a wide variety of tools to experience the hands on elements of transforming ideas into products. The concept of having a very well equipped program drawing from other schools is more effective and efficient than multiple shops with minimal machines and instructors. The opportunities to gain introductory experiences for all things mechanical has undoubtedly been diminished with the decline of rural farm life and the never ending exponential increase of the digital virtual world. However, regardless of the rapid evolution of computers, materials, and artificial intelligence, there will always be a need for the "Hands on Education in a Remote Controlled World."



Fox Valley Tool & Die, Inc., founded in 1966, is a precision job shop that supplies critical machined components for a range of customers, from Fortune 100 companies to local paper mills.

Today we employ more than 180 people at two 65,000 sq. ft. locations in Kaukauna, Wisconsin, in the heart of the beautiful Fox River Valley.

Fox Valley Tool & Die supports Wisconsin's Youth Apprenticeship, Co-operative Education and other related school to work programs. We feel it is a responsibility of ours in being an engaged community partner. FVT&D has a history of internal training and "growing our own employees". We're always interested in recruiting experienced talent who could be an asset to our team and impact our manufacturing resources.

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Sheboygan Falls Transforming Technical Education Continued from Page 9

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 -- identical to ones used in industrial facilities -- that comes to the high school through a partnership between the district and a local manufacturing company.

This company and Sheboygan Falls have worked together before including collaborating on a highly successful summer externship program for teachers where educators spend a week touring the company and its suppliers and learning more about the manufacturing process and the types of careers available there. The goal of such efforts is to raise awareness of the highly skilled nature of manufacturing jobs and encourage more students to consider a career in manufacturing, according to technical talent acquisition coordinator, Scott Kuehn.

"Four year college is not for everyone," said Kuehn. "This really leverages the skill sets some of these students possess. Let's play to their strengths."

Kuehn 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. Under the arrangement between the local company, the district and the manufacturer of the plastic injection molding machine, it will be replaced every two years by a newer model.

The goal of such efforts is to raise awareness of the highly skilled nature of manufacturing jobs and encourage more students to consider a career in manufacturing, according to technical talent acquisition coordinator, Scott Kuehn. "Four year college is not for everyone," said Kuehn. "This really leverages the skill sets some of these students possess. Let's play to their strengths."

"The students are always going to get the latest and greatest in technology," Kuehn said.

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. All of the companies need more skilled workers. 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 Innovation Design Center 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 Innovation Design Center 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.

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 Innovation Design Center and the opportunities it represents would never have been realized.

"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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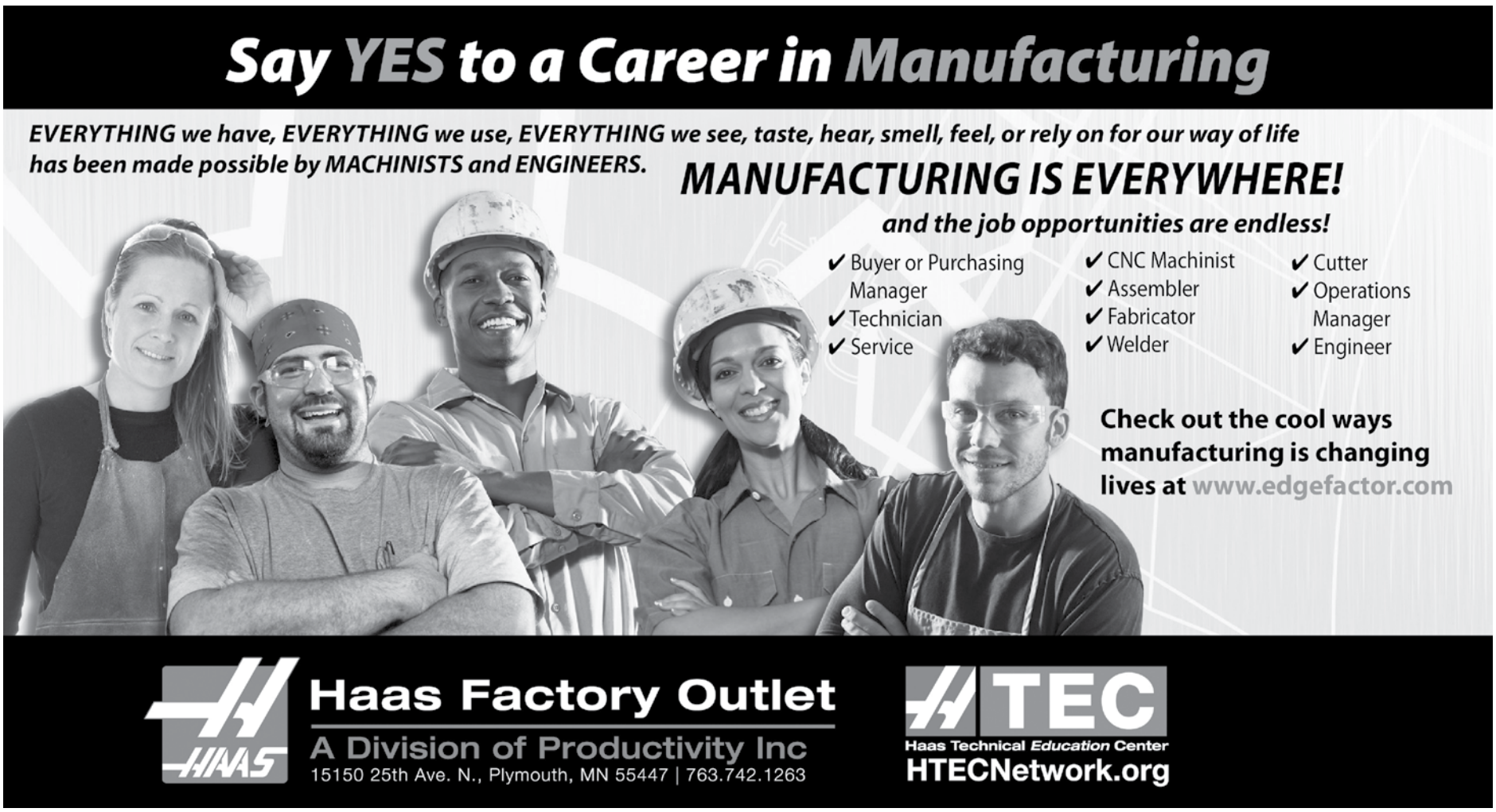

Slinger High School Manufacturing: Above and Beyond With Real World Experiences

Slinger School District

The manufacturing classes at Slinger High School (SHS) strive to offer relevant curriculum and rigorous learning activities that are emphasized through hands on experiences. Students within the program are inspired to discover their interests, talents, and career aspirations while utilizing modern equipment to aid them in solving real world problems that are presented to them through the close relationships that SHS has established with local industry partners.

The close industry partnerships provide SHS students with unique opportunities. Numerous updates to equipment have been accomplished because of industry partnerships. The following is a partial list of what has been updated in the metals lab because of these relationships: CNC mills and lathes, CNC plasma cutter, CNC press brake, welding jig table, guided weld bend tester, various welding and cutting equipment and numerous hand tools and machine tools. More importantly our industry partners help create and shape the curriculum that is passed on to our students. This ensures that we are teaching the most up to date processes and using the equipment to its fullest potential.

SHS Tech Ed. is always trying to find opportunities for students that go beyond the typical classroom. Another great example of this came last year for machine tool students. Responsibility, communication, accountability, time management, and organization are all qualities that SHS Tech Ed. tries to push onto the students. These qualities really get put to the forefront when students are presented with a real world problem from a real company. The machine tool students were presented with a great opportunity from Maysteel LLC. Maysteel is a local manufacturer that specializes in complex sheet metal fabrications. The project that

Continued on Page 18

Maysteel Industries, located in Allenton, WI, recently donated $20,000 to the technology education department at WBHS. Maysteel has previously sponsored a 4H Science Technology Engineering and Math (STEM) academy, presented to WBHS manufacturing students, and donated materials to the manufacturing class. Maysteel also actively supports and recruits WBHS students to become part of their future workforce.

"We are so grateful to Maysteel for their donation," said Jacob Gitter, WBHS manufacturing teacher. "We work hard to do the best that we can for our students and prepare them for the workplace. When companies like Maysteel show support and recognize that, it is uplifting and encouraging to us. It gives us the boost we need to keep doing our best. Not only that, it is even more beneficial to the students. We have already been discussing as a department what we can do to make more and better opportunities for our students. We look forward to working with Maysteel more in the future."

The Benefits and Costs of Apprenticeships: A Business Perspective

The skilled trades that support our nation's construction industry still represent the core of American apprenticeships, but many other industries, like health care and information technology (IT), are adopting apprenticeships to create a skilled workforce for jobs they cannot otherwise fill easily, if at all. Along the way, firms are not only starting apprenticeships in new occupations and industries but also opening doors for women and minorities.

The basic components of apprenticeships are the same today as in 1937, when the National Apprenticeship Act set the foundation for apprenticeships in the United States. Apprentices enter into a structured training program of classroom and paid on-the-job training under the guidance of a mentor. As their skills increase, so do their wages. Upon completion of the program, apprentices earn an industry-recognized credential and usually are hired into a job that marks the start of a career.

The companies in our study were unanimous in their support of apprenticeships. They found value in the program and identified benefits that more than justified the costs and commitments they made to the apprentices.

All of the firms we studied believe that apprenticeships improve their overall performance and provide a competitive advantage over other firms. Companies most often turned to apprenticeships because they could not find labor that met their minimum standards. We can measure the benefits to the apprenticeship model, which is often referred to as "earn and learn," using three types of metrics:

- **Production:** Companies gain the value of output by apprentices and later by apprentice graduates, plus a reduction in errors.
- **Workforce:** Companies experience reduced turnover and improved recruitment, gain a pipeline of skilled employees, and develop future managers.
- **Soft skills:** Apprenticeships lead to improved employee engagement, greater problem-solving ability, flexibility to perform a variety of tasks, and a reduced need for supervision.

Certain employer decisions greatly affect program costs, benefits, and design, such as: program length, apprenticeship wages, training equipment, and program management. Whether companies work alone or in partnership with other businesses, educational institutions, unions, or non-profits also affects the start-up and ongoing costs. In the least expensive programs, employers often worked with the local public school system, especially in states that explicitly connected their career and technical training programs to apprenticeships. Grant funding also offset costs for some firms.

Once a decision has been made to include apprenticeships in a company's workforce strategy, the key to sustaining an apprenticeship program over time is to balance the interests of the employer, the apprentices, and the incumbent workforce. A successful program is one in which all three groups see benefits. It can be tempting for employers to focus too narrowly on their own short-term interests in structuring apprenticeship programs. However, to attract good apprentices, employers must offer a competitive package of current pay, portable credentials, and a relatively high probability of a good job. Similarly, incumbent workers also must benefit from having apprentices by seeing them as teammates helping the company grow and not as competitors for their jobs or promotion opportunities.

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For more information, please contact Debbie Davidson at davidsond@gtc.edu or call 262.564.3422

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- Logistics Analysts
- Logisticians
- Machinists
- Mapping Technicians
- 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
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- Robotics Technicians
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- Semiconductor Processors
- 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.

Explore Manufacturing Careers at www.manfacturingtodaywi.com

Hustisford Tech Ed — Husty Heavy Manufacturing

Dave Jasperson, Tech Ed Teacher
Hustisford Jr/Sr High School

The Hustisford Tech Ed program is going strong! Following are updates to our classes and the HHM (Husty Heavy Manufacturing) as written by the students in these classes.

I am Collin, a Junior at Hustisford High School. I am in an independent study class specifically working on HHM projects. The Milwaukee County Zoo is our returning customer from the 2015–2016 school year, with new project ideas for us to make. Last year we made a triangle pyramid planter for them to plant flowers, and a baby elephant topiary structure, which is roughly 3 feet tall and 5 feet long. Currently they are both on displayed at the zoo.

Now the Zoo wants us to go big and make a topiary swan structure, which is roughly 8 feet tall and 10 feet wide. We have the plans drawn and are getting ready to start working on the swan. We have also been asked to make planters which are 2 feet wide and 4 feet tall with a number 1, 2, and 5 for the flowers to be planted inside the numbers. These numbers were picked specifically because it is the Milwaukee County Zoo's 125th anniversary this year. These planters and topiary swan will be delivered to the zoo and on display this summer for viewing.

A local foundry in Beaver Dam has asked us to make rolling carts with shelves for their foundry business. These carts are 6 feet tall and 3 feet wide and very durable. They have donated the materials and supplies for these carts. We have made several of them already and they are waiting to be delivered to the factory. The company is paying for the labor to fabricate these carts.

I am Demi, a Junior, and I've been in shop for six years, 3 at Hustisford high school. Shop class first interested me when I was in 6th grade. My grandpa had a shop where I worked on making bird houses with him. Since then, I have always been involved in shop classes. In my time in shop class, I enjoyed making gifts for people which was showing my own creativity and uniqueness. Shop class helps me to express myself in ways that other classes don't. For example, my mother enjoys wine. Therefore, I decided to create an intarsia project where I put together a wine bottle and a wine glass. It turned out fabulous, and my mother really loved it! However, one of my favorite projects was one I did in 8th grade. My father is a plumber, so I made a toilet lamp. In the middle of the lamp, there was a place where you could insert tissues. It was incredibly fun creating it, and my father was very grateful. I also tried out a metals class. At first it was pretty scary, but in the end, I realized that I really love doing that. Now I can combine both metals and woods to create even more wonderful, extravagant projects.

I am so thankful that my grandfather introduced me to the shop life! I truly do enjoy working with metals and wood. It changed my outlook on girl standards. I've had such a great time doing this in high school that I'd potentially like to pursue working as a shop teacher in the future.

Hey, my name is Amber! I am a Senior, and I just joined shop this year. The first three years of high school, I was too afraid to even try shop class out. I was nervous that I would get made fun of for not knowing how to do anything. I also didn't believe that I had any interest in learning anything about shop. However, my excellent teacher, Mr. Jasperson, who made me write this article, convinced me that you never truly know until you try. He explained to me the different activities and projects we would do. So I decided to join Woods! To be honest, at first I just took it because I like the teacher, and I didn't want to do another AP class. Fortunately, after a while, I realized that I actually do enjoy working in the shop. I didn't exactly like all the projects that we did, but there was one project that really caught my interest. It's called intarsia. Intarsia is an art where you take several different species of wood and carve and sand them to create a certain shape. Eventually, once all the shapes are made, you can glue the pieces together to make and animal or thing. The first time around I made a Ying-Yang. I'm not going to lie, it really frustrated me trying to fit the shapes together, but after a while, I finally succeeded, and it looked amazing! I enjoyed the art of intarsia so much that second semester, I decided to take Independent Study. For this class, I am working on making two different intarsia projects: a flower and an angel fish. They are coming along famously, and I love it!

Overall, I am super grateful that I gave Woods a chance. In doing so, I feel much more confident in trying new things. I'm no longer letting my fear of what others might say or think about me control my decisions.

Girls are becoming more involved in tech-ed. There are tons of different classes within the shop that people can take. The girls' interests in shop class has increased over the years due to many reasons. There are several different ways to attract more ladies to the shop. A couple ideas to consider in the shop may include changing projects that allow all students to add their own flare to it, it sounds sexist but add a mirror near the hand washing station . . . it helps. I believe the most important aspect is to get the girls excited about it! It's honestly a fun experience, and girls need to be informed about that. They shouldn't be nervous to try something new.

www.hustisford.k12.wi.us
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Slinger High School Manufacturing: Above and Beyond With Real World Experiences

Continued from Page 15

Maysteel presented was to modify an existing hinge that was being installed onto one of Maysteel's fabrications. All of the qualities above came into play with this project. The hinges had to be modified with great precision. The precision was the first challenge. The 2nd challenge became the quantity. This led students to utilizing a fixture system that they designed, and a CNC program within a CNC machining center. The 3rd challenge became the timeframe. A first, the students had about 4 weeks, but that time frame quickly changed, and then changed again! Again, an experience in reality. Students were also responsible for quoting the job, which involved material estimation, labor estimation, tooling costs, etc. A valuable experience that had real repercussions. Ultimately the students rose to the occasion and completed the project. The day after the hinges were completed and delivered, they were then shipped to the customer. The customer happened to be located in Australia! Needless to say, the students were extremely excited. The lessons learned in responsibility, communication, accountability, time management, and organization were definitely felt by the students. It was a great experience that the students won't soon forget.

The days of gaining a job with solely a high school diploma are mostly gone, if not completely. Being able to show proof of skills and knowledge can go a long way in obtaining a job or at least getting your foot in the door. For the last two semesters SHS welding students have had the opportunity to earn welding credentials from the State of Wisconsin. 9 students in two semesters were able to pass the D1.1 structural steel welding test to earn the right to call themselves a "State Certified Welder". All tests were conducted under the watchful eye of a Certified Welding Inspector. These credentials show proof of the student's skill and knowledge. This is just one of many credentials that we offer to help lead students to a stable, engaging, and fulfilling career in manufacturing.

These opportunities are made possible because of the great relationships that we have established with local industry partners. It's experiences like the ones above that ensure our students are graduating with the necessary knowledge and skills to succeed in life after high school.

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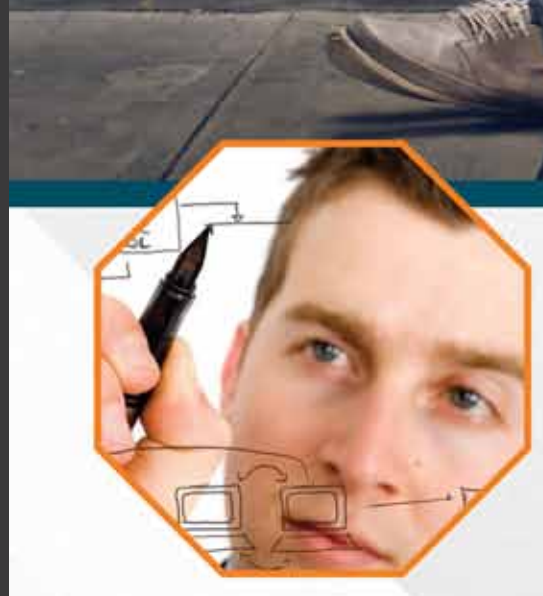

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