



# MANUFACTURING TODAY WI

## Learning Skills Today for Tomorrow's Careers

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

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### The Three Lakes Bluejay CNC Club

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### Spartan Manufacturing Company

**Page 5** — Spartan Manufacturing Company can not only increase career interest but increase employment after graduation for our special education students at Oshkosh North High School. Manufacturing is a career that would increase students' income and allow students to have independence in our community after learning hands on manufacturing skills.



### The Cardinal Way

**Page 7** — These are some highlights from the Cardinal MFG Guidebook for School Districts which was completed in 2014. The entire guidebook can be downloaded from their website [cardinalmanufacturing.org](http://cardinalmanufacturing.org). This binder attempts to cover the most common questions school districts have when starting up or growing their in-school manufacturing programs.



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# Learning Skills Today for Tomorrow's Careers

## Choosing The Career That Fits You

**Page 6** — Read about two TLX Technologies employees, Jenn — Artist and hands-on creative thinker and Alex — Process improvement aficionado, and the paths they followed towards their careers. Regardless of what career path you choose to pursue, there are many doors of opportunity available to you in manufacturing right here in Wisconsin.



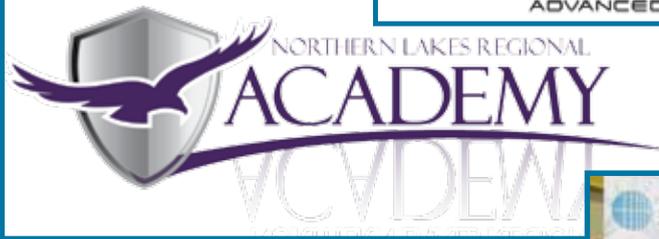
## Menomonie Mustang Manufacturing

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## Making Students Into Makers

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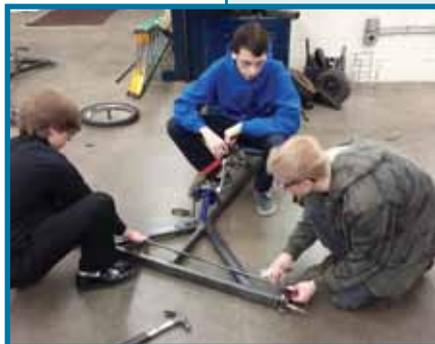
## Purple Knight Manufacturing

**Page 12** — Three years ago, printing three-dimensional objects at home might have sounded like a thing out of

*The Jetsons*. But in just a few short years, 3D printing has exploded — shifting from a niche technology to a game-changing innovation that is capturing the imagination of major manufacturers and hobbyists alike.

## High School Manufacturing In The 21st Century

**Page 14** — At Badger High School, we are fortunate to have a dedicated instructor teaching a four-year, industry-driven curriculum in metals, machining and welding in a program that combines relevant projects with industry certifications. Add to that, the local manufacturing community is involved in helping to build that bridge from school to careers.



## Soon to be the Big 4-0, but Dynamic Tool & Design is getting younger & younger

**Page 13** — The apprentice program at Dynamic Tool & Design is a key part of our company organizational plan and has helped us achieve 40 years of continued growth. Dynamic works closely with the Wisconsin Youth Apprenticeship program and WCTC's Dual Enrollment Program.

## Future Forward Neenah

**Page 15** — For most high school students, community service is something that takes place outside the classroom. But for students in Neenah High School's Manufacturing and Engineering program, being community minded is simply part of their regular school day. A second-year program called "Future Forward Neenah" is helping students become more connected with their community. The capstone course offers in-depth experience for students in the design and manufacturing fields.



## Husty Heavy Manufacturing

**Page 16** — Change and growth are the common themes in our CTE courses at Hustisford High School. During the past school year the Tech Ed department has 'gathered' several machine tools and tooling; totaling more than \$25,000! Our goal to open a school-based manufacturing company, Husty Heavy Manufacturing, is coming to fruition.

## My Dream Career: Pipeline Welding

**Page 17** — My dream career is to travel around the United States and work on an oil pipeline. I chose this topic because I have a strong interest in welding. Next year I plan to attend a nearby technical college for their 2 year welding program. Overall I would recommend welding to hands on type of students who are willing to learn a good trade.

## Slinger High School Manufacturing: Above And Beyond With Real World Experiences



Students who just passed their test and can be called "State Certified Welders"

Aaron Pokrzywa, *Technology and Engineering Metals Manufacturing, Slinger High School*

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 estab-

lished 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.

These partnerships extend beyond just the equipment. SHS partnerships have led to some unique learning experiences for our students that go beyond the typical classroom. For the last 2 years students have had the opportunity to partake in an advanced fabrication project for a local fabrication company. They specialize in the design and fabrication of hydraulic tanks that are used in the heavy equipment sector. Each semester 2nd year welding students test their welding skills to industry standards and qualifications. This is accomplished through a "training tank" project. Students fabricate the hydraulic tank to the company's specifications. From there the tank is pressure tested and evaluated by a team of professionals that include engineers, weld trainers, and quality control technicians. Throughout this process the students are learning directly from the professionals and are able to get a real understanding of what industry quality really looks like.

SHS Tech Ed. is always trying to find opportunities for students that go beyond the typical classroom. Another great example of this came this year for machine tool students.



Student practicing welding

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. This past semester machine tool students were presented with a great opportunity from a local manufacturer that specializes in complex sheet metal fabrications. The project that the company

**Continued on Page 15**

## The Three Lakes Bluejay CNC Club



By Al Votis  
*Three Lakes School District*

This year Three Lakes' Technology Education Teacher, Mike Gorney, has worked to help expand opportunities for students in Three Lakes' Fab Lab and in his classes by starting the Bluejay CNC Club.

The CNC club was started to let any student in grades 7-12 get extra experience using Fab Lab equipment, such as the CNC router, CNC plasma and the laser engraver, as well as traditional shop equipment, and to use that experience to both design and create gifts, specialty items, or parts for local businesses. The club also has a licensing agreement to produce and market Bucky Badger items. The CNC Club has already produced and sold a number of different items, from plasma cut and powder coated Badgers, to cribbage boards, and parts for replacing or repairing

equipment for various people.

There are several different opportunities for students; students can work on the design aspect, using software like Solidworks, Vectric Aspire, or Adobe Illustrator to create the plans for a customer or an idea that they have. They

can work on the manufacturing side, taking the plans and setting up the equipment to run the parts and then to assemble the items. Students are really getting more of a hands on, practical side, because they are able to see not only one part of what it really takes to be in, or to run a business. "They can see the process all the way though, from designing, manufacturing, and marketing," says Gorney. The students who participate in the club, even if only for a single project, are gaining skills which will make them more employable and marketable in the future.

Besides gaining skills and learning more about manufacturing and marketing using CNC equipment, the club also has been able to use the money that has been made to purchase additional equipment. For example, this year, the club has already purchased a sandblast cabinet which will help to keep more of the production part here at the school. Many of our items we send out to get sandblasted and powder coated, but the more equipment we can purchase for ourselves, the more of these jobs and opportunities the students can have to experiment and learn, and be even more job ready when they leave Three Lakes.

Students also have an opportunity to travel to local industries to see their manufacturing techniques, and to make connections



between what they have been doing at school, and what they may be able to do once they graduate. "Creating these industry ties for our students is another big aspect that both the Fab Lab and the CNC club can do for our students. These opportunities open doors for them that they may not even have known were available before, and we're looking forward to seeing our students move out into the community to get internships, and then jobs with these companies, and maybe even starting their own businesses someday" said Gorney.

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# Spartan Manufacturing Company

*Kyle Quednow  
Vocational Skills Program  
Oshkosh North High School*

In what industry, can an employee watch how things are made and where tangible goods are a demand in what has become a digital world? Manufacturing. Wisconsin is ranked fifth in our nation in manufactured exported goods. Manufacturing is a growing industry in our area with the prediction that the Fox Cities will need over hundred additional employees each year for the next ten years. The need defined what could not only increase career interest but increase employment after graduation for our special education students at Oshkosh North High School. Manufacturing is a career that would increase students' income and allow students to have independence in our community after learning hands on manufacturing skills.

To help students in preparation for a manufacturing career, Oshkosh North High School has implemented a new class using the Project G.R.I.L.L. program. This program was the perfect curriculum to bring to Oshkosh to increase students understanding of the demand in the manufacturing industry in the Oshkosh Community. The goal of Project G.R.I.L.L. is to increase the number of high school graduates interested in manufacturing careers. Project

G.R.I.L.L. pairs high schools with manufacturing companies to manufacture a grill through partnered design. G.R.I.L.L. stands for "Growing Readiness in Learning and Leading." The program's mission is to "improve the image of manufacturing by exposing the community, educators, students and parents to the diverse career opportunities within . . ." Wisconsin, or in Oshkosh North's case, Winnebago County manufacturing companies.

This opportunity is for 14 to 18 students in total each year. Four-six regular education students mentor students with disabilities with less experience, skills; in welding, design, marketing, and finance. The class runs like a business. Students are in charge of carrying out the daily activities and flow of the project. Oshkosh North regular education staff and special education teachers, Mr. Quednow and Mrs. Williams, are in the class for safety, quality control, and assistance with breaking down material to meet each student's needs. The



business that partnered with the newly formed "Spartan Manufacturing Company" supports, through hands on assistance, in the design and build of a grill. Throughout the process, students experience design, assembly, project management, marketing, and finance skills needed to run a small company.

Through the interview and hiring process with the business, mentors were partnered with students with disabilities in their area of interest. Together the employees of Spartan Manufacturing Company gain skills needed to be a good production worker including practical skills, the ability to work quickly and methodically, and collaboration skills while concentrating on repetitive tasks. Students gain the understanding of what is needed to be a successful employee in the manufacturing career by following instructions, becoming aware of health and safety, and learning to become flexible. Many times products need to be reworked over and over before gaining approval and creating a product that is appealing to one's customer.

We continue to spread the word about this great partnership and opportunity in our school. Students within our school are asking about the class and express the desire to take part next year. Oshkosh North student, Jordan Demille, head of Marketing and Finance for Spartan Manufacturing Company said, "I am graduating this year with more self-esteem and self-determination than I ever had." Jordan is a student with disabilities who among many things, writes articles within the school company. He's been published in the school newspaper, "North Star," the local newspaper, "The Northwestern," and has interest from a manufacturing newspaper. Jordan's articles have been reviewed in China by the

business partners for approval. Jordan entered into college under the Youth Options Program. He successfully completed 5 credits at a local technical college and is currently taking a 3 credit Sociology course.

"I've learned so much working with our business partners about designing and communication. The biggest lesson is every approval takes time in the real world. Approval does not come the next day or even the next week, but I just need to continue working on the next project until I hear from our business partners."

— Jordan Demille  
Spartan Manufacturing Company

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The Project G.R.I.L.L. partnership has taught us a great deal. We have learned to identify our community's needs and to implement those hands on lessons to increase the skills needed by local business partners so that we are able to graduate and fill the current employment gaps that exist in our area. Spartan Manufacturing Company has found a way to assist special education students by increasing the skills needed to work in careers that will provide independence, financial stability, and pride in our careers.

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# Choosing The Career That Fits You



Choosing a career can be a daunting and scary proposition for many students. A few students know from an early age what they want to do for their vocation and consistently pursue that dream their whole life. Some students head off to college hoping that they will figure it out at some point. The reality is that most of us stumble into what we enjoy doing through a series of opportunities that are presented to us throughout our lives.

## Meet Jenn — Artist and hands-on creative thinker

Jenn never went looking for a career in manufacturing...it found her. As a child, she always enjoyed creating things with her hands. This eventually translated into the pursuit of an art degree in college. Once graduated, she was having difficulty finding a job in her field of study and soon found that she needed to pursue other avenues in order to provide a living. Through a friend, she found out that TLX was looking to hire a few people. In the ten years she has been with TLX, Jenn has moved into different roles gaining experience and knowledge in the various aspects of the development to production process.

So how does an art degree help someone in manufacturing? Jenn's creative thinking and desire to learn has allowed her to get involved in many stages of a product's development. She found learning about the different processes has been very interesting and challenging. Additionally, being part of the team that works to make things better and more efficient so that TLX is developing

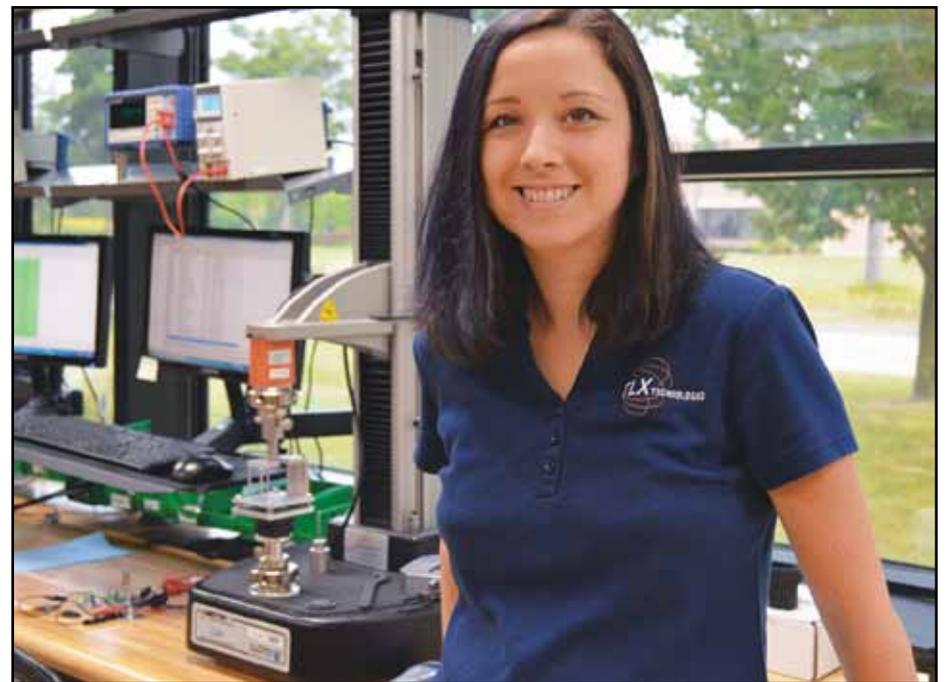
the cleanest and leanest part has been exciting and rewarding. In her own words, Jenn said that she takes great satisfaction when she sees components get shipped out the door to the customer because she knows that they are quality products that have been developed and made exactly to the customer's specifications.

Her advice to students? Get into a small company and grow with it. Being in a smaller company provides many opportunities to gain knowledge and understanding that will help you grow both personally and professionally. ▶

## Meet Alex — Process improvement aficionado

Accounting was the original career path Alex intended to follow as an assessment test taken in high school scored him high for that field. As a result, Alex pursued a business co-op opportunity in an accounting department at a credit union when it presented itself during high school. He quickly came to the realization that accounting was not the path he wanted to pursue. However, what the test did reveal was Alex's affinity for detail and efficiency.

He also took advantage of another opportunity to attend an engineering summer camp at UW Milwaukee. During the camp he learned about all types of engineering careers, one of them being an industrial engineer. Until that time, he had no idea that there was a career that was centered on process efficiency and improvement. He realized that with an industrial engineering degree he would have many



options available to him after college. Shortly after graduating, Alex joined TLX as an engineer on the quality team.

So, what exactly does an industrial engineer do in manufacturing? Not only does Alex spend his days working with individuals on the production line to improve the process of how something is made, but he also works closely with the design engineers to incorporate quality and efficiency into the design process. Alex has been surprised at how much there is to learn about all the systems and processes that go into making a quality finished product. The constant challenge of learning and working to improve both product and processes provides endless opportunities for creativity and innovation.

His advice to students? Figure out what you are interested in and take every opportunity to learn about

that subject. If you are unsure, try as many different things as you can until you find what interests you. Lastly, don't be afraid to talk to adults who have jobs in the field you are interested in. You will find that they will be more willing than you might think to take the time to answer your questions and to talk to you about their career.

TLX Technologies is excited about the future of manufacturing here in the United States. Regardless of what career path you choose to pursue, there are many doors of opportunity available to you in manufacturing right here in Wisconsin. We would like to invite you to explore what options are available to you through classes, programs and internships available through your school or community. If you have any questions, please contact TLX at [pr@tlxtech.com](mailto:pr@tlxtech.com) or visit our website at [www.tlxtech.com](http://www.tlxtech.com).

The logo for Manufacturing Today WI, featuring the word 'MANUFACTURING' in a large, blue, stylized font with a gear-like pattern, and 'TODAY WI' in a smaller, white, sans-serif font below it.

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# The Cardinal Way



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Cardinal Manufacturing, a student run

manufacturing operation or School Based Enterprise (SBE), began in the Eleva-Strum School District during the 2007–2008 academic year when instructor, Craig Cegielski, approached the School Board about the potential of pursuing an in-school manufacturing business similar to one he started in his prior school district in Antigo, WI.

The school board approved and since that time Cardinal Manufacturing has gone from its infant stages to a company which had more than \$70,000 in income during the 2013–14 academic year. The growth of the program has attracted national and international attention and Cardinal Manufacturing has attended national tradeshows and hosted celebrity guests.

Cardinal Manufacturing has served hundreds of customers from private individuals to clients throughout the state of Wisconsin and other parts of the country. A number of students have gone directly to skilled employment positions after high school, but most choose to go on to post-secondary education through technical college or the university system.

Craig Cegielski, instructor and founder and Craig Semingson, District Administrator, are contacted by hundreds of individuals each year who have an interest in starting or

enhancing their in-school manufacturing programs.

In-school manufacturing programs such as Cardinal Manufacturing serve as a grass-roots economic development effort. Not only do these programs expose students to career opportunities in manufacturing, but they also work toward changing the attitudes of counselors and parents to be more open to the idea of encouraging students to look at manufacturing careers. Students get hands-on opportunities to try out these roles before making an expensive decision in choosing a post-secondary program. In other words, kids get the chance to try welding, machining, construction, office management, and marketing prior to committing to a major or area of study.

## Planning/Beginning

### Step One: Situation Analysis

The Eleva-Strum School District was very supportive of the idea of Cardinal Manufacturing from the moment it was proposed by instructor, Craig Cegielski. This isn't always the case and many districts have numerous questions and ask for written plans and documentation of other programs prior to supporting the idea. While Cardinal Manufacturing did not have to officially go through



these steps, we understand that many organizations have to do so.

## Situation Analysis

The first step most districts go through is a situation analysis. This can be done on your own or with the help of students or volunteers.

Continued on Page 16

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all the possibilities advanced manufacturing has to offer?



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# Mustang Manufacturing

## School District of the Menomonie Area



Across Wisconsin, educators continually strive to offer realistic learning experiences for their student populations in an effort to address our country's ever increasing skill's gap. There is a universal agreement that students must encompass a broad skill-set in order to be successful in today's ever-changing workforce including both technical skills and the often hard to teach soft-skills. Teaching and learning can no longer exist in "silos" but must encompass a collaborative atmosphere filled with project-based learning and a blend of rich curriculum. For students to learn this often difficult to teach subject matter, many schools have added student-operated enterprises to their course offerings. Schools who have done this, have found that they are

naturally equipped for these programs as they typically have well-rounded technology education programs coupled with strong business/marketing programs staffed with creative teachers and supportive administration teams. With these key components, student-operated enterprises are a viable option for our schools.

Menomonie has recently developed a student-operated enterprise called Mustang Manufacturing.

Students are cross trained in each department, moving from each element to the next, marketing, production, business and more. This gives them knowledge and skills for each section of the manufacturing business. The result has been many new ideas from students! We have also seen a large increase in community, school and staff participation and involvement.

Mustang Manufacturing is an initiative that produces a variety of products including custom manufactured furniture, plaques, name plates, small construction projects, machined parts and a variety of other products. Products are manufactured according to customer requests. Students utilize the school metal's lab, woodworking lab and FabLab, equipped with both traditional manual machinery and CNC machinery, to produce the needed orders. Currently, participants are senior level students concentrating in the business/marketing or technology programs enrolled in the school's capstone senior internship (work-based learning) program. The business and marketing students

are responsible for all of the billing, payroll, web-page design and marketing components; whereas, the technology students handle the manufacturing components of the business including material inventory, machine maintenance, and all production requirements. All of these students work closely with the business/marketing teachers and technology teachers who are responsible for the supervision of the program. Students participating in the program are paid through "piece work" with 75% of the profits going to the students and 25% of the profits going towards the upkeep of equipment and business expansion. A typical work day for the student employees is 12:45 pm to 3:45 pm Monday through Friday with the option for extra hours if so desired or needed.

The development and operation of the enterprise has been a total school partnership. Initial conversation of the idea started with the business and marketing department, the technology education department, high school administrators and the director of curriculum. Stakeholders agreed that this would be an excellent opportunity for our students and were excited to make it a reality. With the "seed planted", the idea was brought to the district business manager and human resource director. Everyone was in total support of the idea and agreed

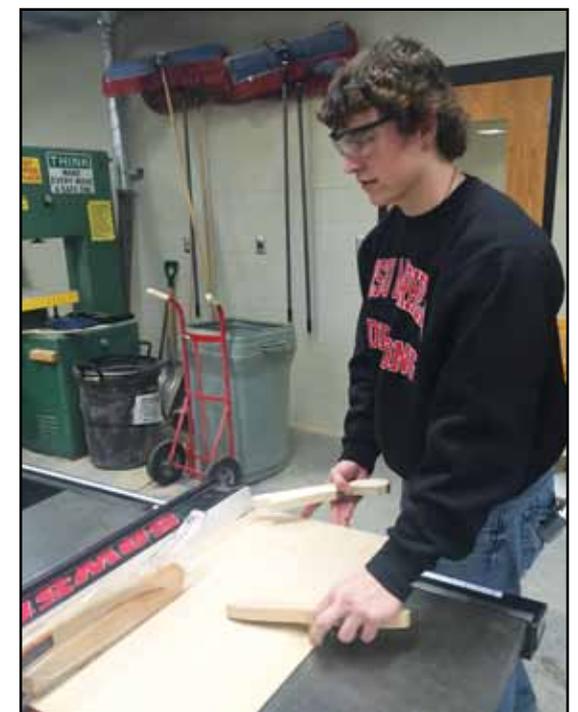
that this would be an excellent opportunity for our kids. They then worked many hours to make the enterprise a reality. We are lucky at Menomonie to have such a great administrative team, who is student focused! Our school's curriculum director approved the program. The school's business director developed an account for the enterprise for deposits and another account to distribute payroll. The human resource director hired the students as district employees. Our high school administration approved the course offering and was instrumental in offering the course as part of the school day during our school's senior internship program. From that point the program was made a reality. We are currently in our third year of Mustang Manufacturing and are happy with the development of the program and



excited of its future.

In closing, we feel that Mustang Manufacturing follows our district's mission to prepare students to become lifelong learners, caring individuals and responsible citizens; adding to Menomonie's already rich educational system. Students participating in this program develop skills (soft skills) which are much more difficult to teach than learning to operate equipment or deliver a finished product. These skills include the ability to learn, reason, prioritize, understand time management, communication, work ethic, honesty, problem solving, teamwork, creativity and a host of other skills. We feel that transferrable skills such as these will last our students a lifetime equipping them for success in whatever career they choose, as we are often educating our students for a career that may still not exist.

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# Making Students Into Makers

By Jeremy "Pete" Peterson  
NLRA Lead-teacher

In 2012 the Rice Lake Area School district opened Northern Lakes Regional Academy (NLRA), a STEAM focused charter high school. NLRA is a district innovation zone, focused on facilitating teacher development around an interdisciplinary, personalized, and project-based approach to learning. NLRA's mission is to inspire and empower students to utilize science, tinkering, engineering, aesthetic design principles, and math creating innovative means for self-expression while contributing to the community.

In order to facilitate this mission, the long-term vision for NLRA's facility is to become both a district and Rice Lake Community Makerspace where staff, students, area business, and community members can collaborate on meaningful, expressive, and entrepreneurial projects that positively impact our area. Opposed to Carnegie classes, most instruction at NLRA takes place during interdisciplinary seminars, workshops, and student-led projects that are generally co-taught by several instructors and community experts.

Since NLRA was opened, the district has heavily invested in training staff to build capacity to facilitate project-based learning experiences for students utilizing a limited

amount of digital fabrication tools. Using this unique interdisciplinary approach, NLRA staff has been able to effectively develop and pilot a curriculum that engages students with digital design and fabrication skills while learning in other core curriculum areas. This is a unique to education since it engages all learners with digital design and fabrication skills, not just those students who traditionally would have to enroll in Technology Education or Manufacturing courses to get exposure to digital design and fabrication. Over the last few years, NLRA has created a small fabrication lab to provide their students with proper equipment to construct high-quality projects. Our long-term goal is to develop this lab into a state of the art Fab Lab that our students, other district students, and community members can come to collaborate and quickly prototype and customize ideas through open source software and hardware.

At NLRA, we believe that the key to modernizing manufacturing and stimulating economic development in northern Wisconsin lies in exposing all students to the tools, skills, and philosophies of the Maker movement. Over the last two years staff at NLRA has piloted integrating a mandatory seminar on modern manufacturing for all students entitled "Are You a Maker". This seminar looks at not



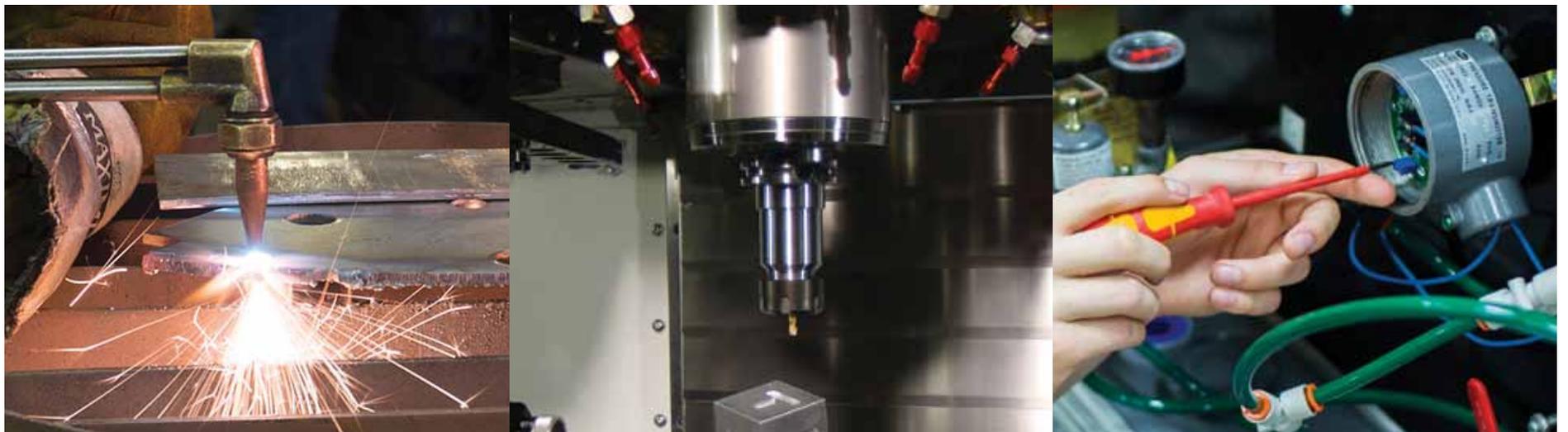
only the technology and philosophy differences between traditional and modern manufacturing, but exposes all of our students to technology such as 3D printing, CNC, and laser cutting. Using Chris Anderson's book *Makers: The New Industrial Revolution* as our guiding text, we engage students by asking them to create a project that represents them as a Maker using one or more of our design lab tools.

This year, we will be piloting an entrepreneurial seminar in which students will use fabrication tools to design, prototype, market, and pitch a product that could be mass produced to earn money for sustaining our Fab Lab. Our long term goal is for the core subject curriculum for all of our students to be completely intertwined with entrepreneurship and digital fabrication skills through a series of open-ended teacher designed and community supported projects and challenges. In turn, these standard experiences stimulate the curi-

osity of students to engage in projects in which learning is guided by their driving questions.

At NLRA, we are excited to work with manufacturing and community collaborators at any level. Please feel free to contact me, Jeremy "Pete" Peterson at [peteronje@ricelake.k12.wi.us](mailto:peteronje@ricelake.k12.wi.us) or 715-234-5458 to learn more about NLRA's unique design curriculum and our goal to create an entire high school curriculum around a state of the art Fab Lab. Check out our website at [northernlakesregionalacademy.org](http://northernlakesregionalacademy.org) to learn more as well as see how NLRA students have connected digital fabrication to high altitude helium ballooning.

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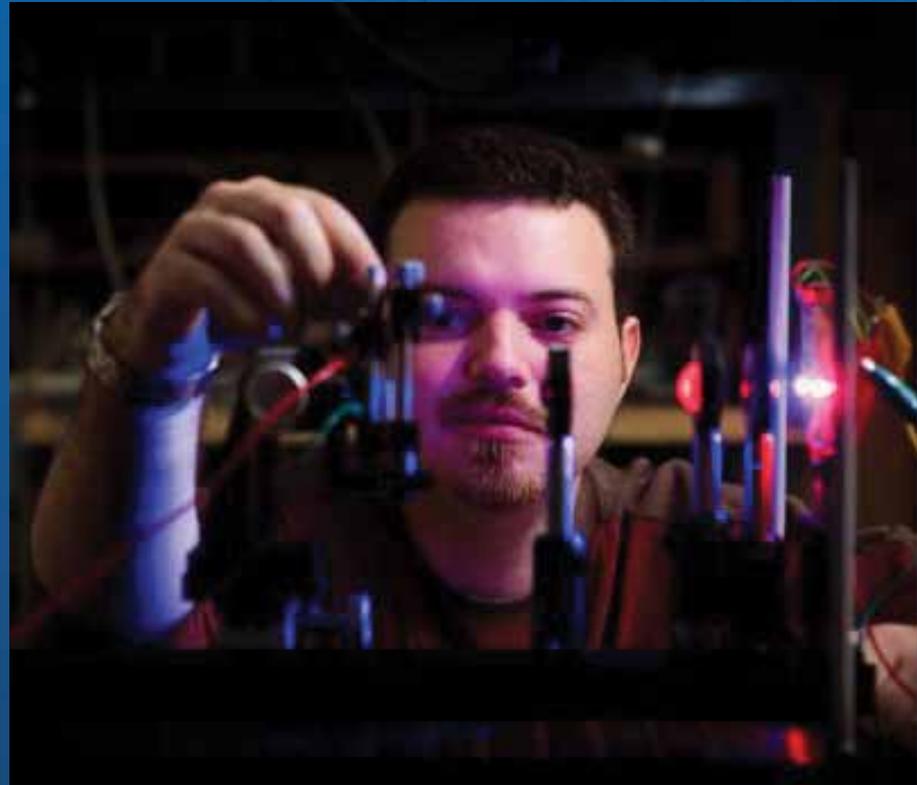
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UNIVERSITY OF WISCONSIN

Colleges

## Purple Knight Manufacturing Where Are We Going Next?

Ryan Rewey, CTE/REACH Director;  
Terry Schindler, Technology and Engineering  
Instructor, School District of Beloit

Where are we going next? The School District of Beloit's Career and Technical Education program has re-branded itself. In today's world of highly technical skilled careers it is crucial that people look at Career and Technical Education in a different light. Often times when we discuss Technology Education, people remember it as wood shop, or metals. It is far more today than the programming of the past. Beloit's **REACH Advanced Career Education** program is about providing technical skills and training that will help prepare students for the workforce or continued education. Three years ago the Beloit School District invested in helping change this image by updating our CNC and Welding programs. This included input from professionals in the community, it was determined at that time the equipment in the space did not reflect the industry of today. This required an extensive renovation as well as equipment investments to help revitalize the program. Today we look to provide new opportunities for students to help prepare them for life after high school.

The manufacturing industry has been on unstable ground since 2008 when the market

crashed. The program that we are developing at Beloit Memorial High School (Purple Knight Manufacturing) will hopefully help our students weather this type of turbulence and come out prepared. It is our intention to have all students who complete our 3 levels of machining or welding courses leave with industry certifications.

Our instructor Terry Schindler comes to us with 11 years of machining and welding experience. Terry transitioned from our middle school program where he taught PLTW and Technology Education classes. Currently Mr. Schindler is working at getting his students' credentials and certifications for the National Institute for Metalworking Skills (NIMS) and the American Welding Society SENSE program. Both of these programs offer certifications that are transferrable, so the students can take them wherever they go in manufacturing. Many companies train and test their employees to their standards, but those standards often times do not transfer with the employee to another company. These programs will help eliminate situations like this and hopefully provide employers with more competent and skilled employees.

Our manufacturing advisory committees have played an integral part in the development of the program and the direction we are headed



ADVANCED CAREER EDUCATION

in. A key topic in our meetings is curriculum and what must be covered so that our students are prepared for a career in manufacturing. One of our local companies has made a commitment to have one of their employee owners spend one day per month working in the shop with Mr. Schindler. They are doing this to help mentor the students and to give them insight into the industry. The advisory committee is the key to networking, whenever we have a question or a problem we reach out to the members of our committee for assistance. The nice part is that if they are not able to help, they know someone who can. We are continually adding more people to our committee because of these relationships that we have forged.

Our welding program is just getting started with the AWS SENSE program. We have also had Instructor Dan Crifase from a local technical college come in to present several times this past semester on topics like welding blueprints and Gas Tungsten Arc Welding on aluminum and stainless steel. We are also working towards transcripted credits. Recently the addition of a weld bend tester has made it possible for our students

to test weld specimens that they have completed.

Purple Knight Manufacturing is creating a community to sustain and grow our program. Through our different initiatives and relationships we are setting our students and our program up for continued success. While we still have improvements to be made, we hope our program allows our students to REACH for new opportunities, and to REACH their potential that will better prepare them for what lies ahead.

To learn more about our REACH Program please contact CTE/REACH Director Ryan Rewey at [rrewey@sdb.k12.wi.us](mailto:rrewey@sdb.k12.wi.us) or 1.608.361.3206

To learn more about our CNC Manufacturing/Welding program please contact Technology and Engineering instructor Terry Schindler at [tschindler@sdb.k12.wi.us](mailto:tschindler@sdb.k12.wi.us) or (608) 361-3046.

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# Soon to be the Big 4-0, but Dynamic Tool & Design is getting younger and younger

Lori Phillips

Dynamic Tool & Design, Inc.

The apprentice program at Dynamic Tool & Design is a key part of our company organizational plan and has helped us achieve 40 years of continued growth. Dynamic employs 60 people and the average employee tenure is 14 years. With all of the great history and longevity, it is also worthwhile to note that Dynamic is getting younger and younger. Over the past four years we have tripled the number of employees under the age of 35. Apprentice programs are helping drive that growth.

Our tenured employees have a vast wealth of knowledge and the apprentice programs allow the opportunity to train our younger, tech-savvy employees. We currently have three employees enrolled in the State of Wisconsin apprentice program and four employees enrolled in our own internal apprentice program. Both programs require the apprentice to complete 10,400 hours of training over five years.

The apprentice program allows employees to be trained without having any prior knowledge or experience. Ben Clark, who has been an internal apprentice for a year and a half, worked at a trucking company prior to Dynamic. He is currently learning the inspection process and looks

forward to learning other areas of the shop. The apprentice program gives an employee the chance to build a solid career from the ground up. Keone Evans recently signed his contract to enter the Registered Apprentice program.

Dynamic works closely with the Wisconsin Youth Apprenticeship program and WCTC's Dual Enrollment Program. The Dual Enrollment program allows high school students to attend college classes and earn college credits while still in high school.

"Dynamic Tool & Design has supported the Registered Apprenticeship program for over 30 years and is proud to support the Youth Apprenticeship Program," said David Miller, President of Dynamic Tool & Design. "The company continually looks to local high schools and colleges for new talent. The Youth Apprentice/Registered Apprenticeship program is a win-win for Michael and Dynamic Tool and will help us maintain our industry leadership," Miller said.

Recent high school graduate, Michael Nareski is the first DEA graduate to apply the academy's curriculum and Youth Apprenticeship hours and competencies toward a Registered Apprenticeship as a Tool and Die Maker.

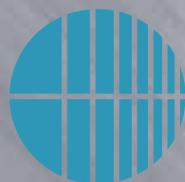


Nareski attended E-Achieve Academy – an independent virtual charter school administered through the School District of Waukesha – and through his concurrent DEA curriculum was able to complete six of the required courses for a Tool and Die Maker Apprenticeship, which is equivalent to 250 hours of the 576 hours of required

paid related instruction. Nareski was credited 350 of his 712 hours worked in his Youth Apprenticeship in Manufacturing and will complete his Registered Apprenticeship coursework at WCTC.

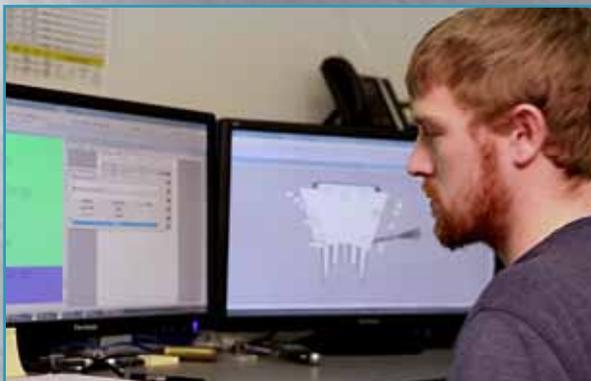
"This alone saves Dynamic Tool the

**Continued on Page 18**



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# High School Manufacturing in the 21st Century



By Marie Collins  
Career & Technical Education Coordinator  
Badger High School

Engaging students in the manufacturing process is something we struggle with in the 21st century educational setting. From student perception to the high cost of equip-

ment to lack of qualified teachers, the issues facing districts are numerous and tangible. Yet labor projections and local leaders indicate a need and we, as educators, must find ways to help fill the pipeline of qualified talent into the manufacturing field. At Badger High School, we are fortunate to have a dedicated instruc-

tor teaching a four-year, industry-driven curriculum in metals, machining and welding in a program that combines relevant projects with industry certifications. Add to that, the local manufacturing community is involved in helping to build that bridge from school to careers.

Instructor Clint Geissler has manufactured a program that is addressing the needs of the industry while keeping kids interested through projects they can relate to, culminating with their senior capstone project where teams of students manufacture a custom chopper from conception to completion. The kids are in it for the projects, but along the way they are earning two industry certifications from the Manufacturing Skills Standards Council (MSSC) and transcribed college credit, and touring local facilities on a regular basis where they can see that the skills and projects they work on in class are honing skills that can earn them a good living in a competitive, local workplace.

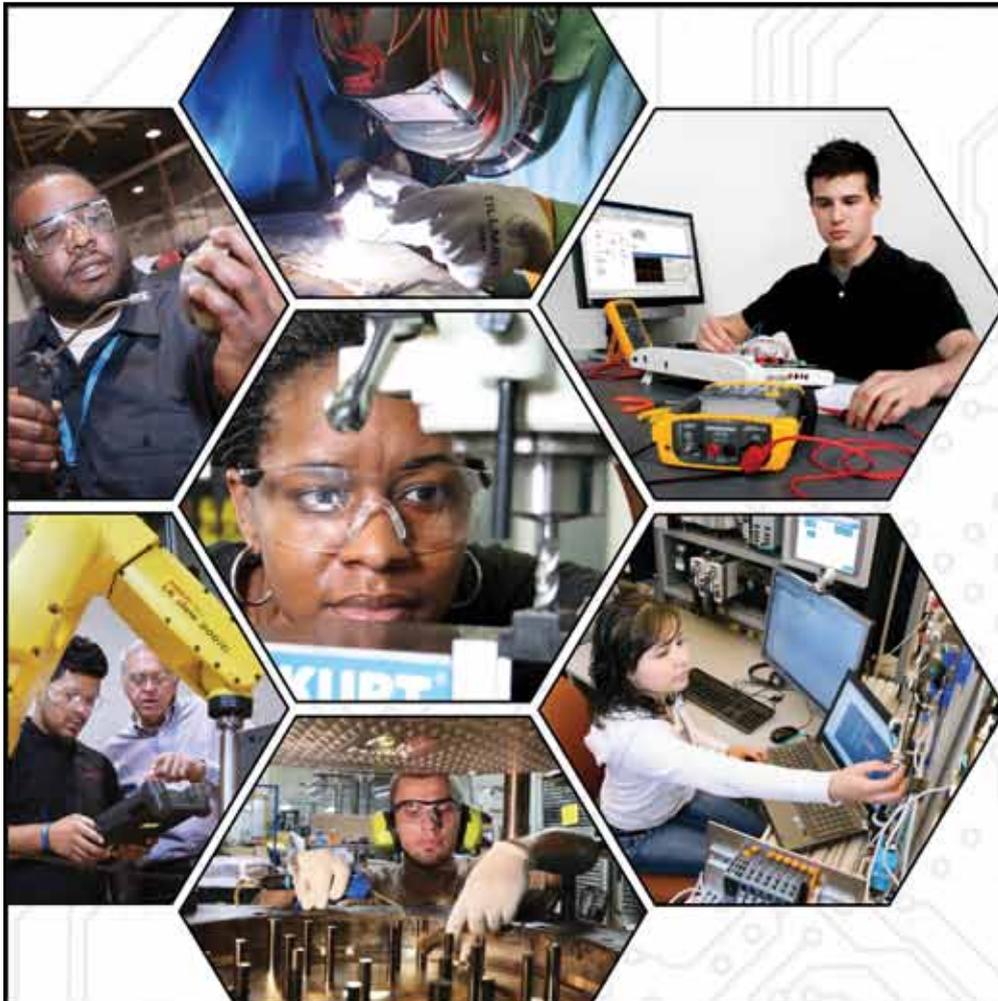
## Manufacturing Month Tours

Teaming up with Gateway Technical College, the Walworth County Job Center and the Walworth County Economic Development Alliance, each year students tour local manu-

facturing facilities during the month of October. These tours are a county-wide effort by the businesses to show students that the dark and dirty days of manufacturing are long-gone, replaced by computer numeric control (CNC) processes that rely on pro-

gramming skills, precision machining and engineering. The businesses buy into the tours by providing tour guides and then lunch for the students. Geissler said the tours provide a benefit to the students. "The biggest thing is that they see what is going on locally. Students are always impressed by knowing that products are made right here in Lake Geneva."

**Continued on Page 17**



## Advanced Manufacturing and Engineering

Gateway Technical College offers state-of-the-art learning facilities that offer globally recognized industry training.

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## “Future Forward Neenah”



*Jim Strick, Communications Manager  
Photos by Sandy Joch, School Year Book  
Advisor  
Neenah Joint School District*

For most high school students, community service is something that takes place outside the classroom. But for students in Neenah High School's Manufacturing and Engineering program, being community minded is simply part of their regular school day.

A second-year program called “Future Forward Neenah” is helping students become more connected with their community. The capstone course offers in-depth experience for students in the design and manufacturing fields.

Among the projects students have completed is a renovation of the school's Mercury Commons. A local foundry provided replica manhole covers that the students welded into tables and chairs for a distinctive study and

relaxation area that serves the entire school of over 1,900 students. A group of 20 students with manufacturing and engineering, art and business education backgrounds combined their skill sets to create the communal space located just outside the school's library.

“We saw an opportunity for our students to make an impact in their community through what they are doing on an everyday basis in the classroom,” technology education teacher Travis McDonough said. “It's gratifying for them to apply their learning and see the fruits of their labor well past graduation.”

The Manufacturing and Engineering students have also assisted in producing plaques for the school district's new Hall of Fame and created a Veterans Memorial Display with drawings etched into aluminum plates and mounted in a display case in the school's hallway. Students also produced items that were sold at the community's Helping Hands Craft Fair in November with all proceeds being donated to local charities.

“These projects compel students to take greater pride in their work and attention to detail,” McDonough added. “When it's something that will be a lasting part of their school or used within the community, they want to make sure it's the highest quality.”

Neenah's PLTW program has been connected to the community through partnerships with local companies. The partnerships have helped students build strong core understanding in computer art and design, programming and skill trades. Students have experienced unique opportunities to work closely with engineers from each company in both their school classroom and at each company's facilities.

High school students have become teachers themselves, leading elementary and middle school students in STEM activities throughout the District.

Course offerings at Neenah High School have focused on needs in skilled labor with the addition of three new welding courses for the 2016-17 school year. In just the past three years, Neenah has gone from four courses in welding



and manufacturing to nine. The School District provided funding for a new welding lab and the construction area has been converted to a manufacturing area. The purchase of a plasma cutter and laser engraver has also made a significant impact in what the students are able to produce.

One of the primary goals of Neenah's manufacturing and engineering program has been to instill confidence in the students as they graduate and head into the workforce, whether in the manufacturing field or a different field.

“We stress to the students that with the right training and the right experiences there's really no limit to the skills they can develop,” McDonough said. “We are fortunate to have so many outstanding manufacturing and engineering companies right here in our own Neenah community that provide such wonderful opportunities for our students.”

With the community partnerships flourishing and the number of new classes being added to the curriculum, there's lots of reason for excitement.

“We have accomplished a lot in recent years, but I still feel like we are just getting started and can achieve much more,” technology education department chair Mike Elkin said. “Just like any manufacturing process, we will continue to evaluate where we can improve and look to get better and better each year.”

## Slinger High School Manufacturing Continued from Page 5

presented was to modify an existing hinge that was being installed onto one of their 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 con-

ducted 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.

[www.slinger.k12.us](http://www.slinger.k12.us)  
(262) 644-9615

[www.neenah.k12.wi.us](http://www.neenah.k12.wi.us)  
(920) 751-6900

# Husty Heavy Manufacturing



The "Hustifork and Spoon" salt and pepper shaker holders, produced by the student-run "Husty Heavy Manufacturing."

Dave Jasperson  
Hustisford High School

Change and growth are the common themes in our CTE courses at Hustisford High School. During the past school year the Tech Ed department has 'gathered' several machine tools and tooling; totaling more than \$25,000! Our goal to open a school-based manufacturing company, Husty Heavy Manufacturing, is

coming to fruition. This undertaking has our small school reaching out to local and regional manufacturers, parents, school administration, school board, and collaboration with other teachers. This may not be a new template to success but it shows the level and breadth of commitment by many individuals, organizations, and industry.

Husty Heavy Manufacturing, HHM, has reached across curricular areas to establish

relationships with the Business Education Teacher and students who generally would not take a Tech Ed class. Their expertise with the business side of a fully functioning school based company is important for its success. This Fall semester I team-taught a class with our Business Education Teacher, Mrs. Denise Tribbey. We created a short-term business called Hustisford and Spoon. We ran the class as an entrepreneur might with the goal of creating a product(s), developing a business plan, designing, producing, sales and marketing, and the financing of the product(s). During this class we successfully produced spoon-and-fork salt and pepper shaker holders, and 'fish' wind chimes.

At the end of the course we focused on the business plan for this company and also for HHM. I have been working closely with several of my upper-level students with either business background and/or Tech Ed. They are helping to design and implement a working business plan, prepare the shop for upcoming production, and to build relationships with local industry. Our CAD class is using SolidWorks to design the products and the students are using our 3d printer to prototype our parts. We are approaching this company with two purposes: custom manufacture parts for local industry, and to

produce and sell our own product (custom targeting devices for law enforcement and personal use).

I know we are on the right track as our school board has approved the purchase of a CNC plasma cutter; the first major expense to the Tech Ed department since I started 1 1/2 years ago. We will have this machine in our shop by the first week of February and plan to have it operational shortly after that time. This machine is the cornerstone to production of our parts and assemblies and our school board is showing its support. However, three of our local businesses have also stepped up by each donating \$500.00 toward the purchase of this \$10,000 machine. I would like to thank them as they each see the need to prepare our students for the future of manufacturing.

We are a small school doing our best to prepare our students for the world of work whether it is in production, engineering, or the business end of an entrepreneurial endeavor.

[www.hustisford.k12.wi.us](http://www.hustisford.k12.wi.us)  
(920) 349-3261



## The Cardinal Way Continued from Page 7

Critical questions you need to answer during this step include:

**Facility analysis**-Does your district currently have the physical space needed to pursue an in-school manufacturing program or are there plans to expand your physical space to accommodate one?

- Take a careful inventory of any space available in your district facilities that may be available.
- Take an inventory of tools and equipment and start a wish list.
- Develop a list of improvements that could be made to your space during class time (building of dividers, cleaning, painting, or other space maintenance)
- Create an initial budget for items that would be needed right away such as paint or cleaning supplies, raw materials, new tools and prioritize that list.
- Start to develop a list of repair or manufacturing projects that could be accomplished in your current facilities and with your current equipment.
- Keep track of all information in a centralized file.

**Private-sector support:** Do you have any local businesses who might be interested in working with you? This is the time to begin

to seek out private industry connections for your project.

**Course development:** Do you have the courses in place for proper prerequisites and can you craft a curriculum to match this program?

**Budgeting:** Is there a way to create the seed funding needed for your initial projects? Now is the time to determine what your initial projects will be and how much income might be generated by sale of goods or services from your program.

### Creation of a Steering Committee

Often times creating a manufacturing program in a school district takes hard work and dedication by a few key individuals. Eleva-Strum's Cardinal Manufacturing Program was created through informal partnerships and cooperation, although most districts need to create a formal committee. Our best suggestions when creating your team include approaching individuals in the following roles:

- School District Representative (most likely the Technology Education teacher)
- Local Economic Development person, if available
- Local Technical College participant, par-

ticular an outreach person or business & industry specialist

- Local Manufacturing Manager or company owner

These key individuals can bring wide-ranging experience and resources to the new entity from public and private sector experiences. Educational connections and economic development groups may provide in-kind services such as consulting or volunteer hours or they may have access to grant funds or political support for your new program. Private industry representatives have a vested interest in workforce development and generally have an interest in investing in improving the quality and quantity of the incoming workforce. Private industry partners are also an important source of work projects for the entity as well as for donations of used equipment and tools.

All key individuals on a steering committee can bring various resources to the project and also help garner community support by addressing the school board and private and public groups.

### Preliminary Plan Creation

An early presentation to the administration should include:

- Needed physical changes to school district facilities, if any
- Necessary additions to current curriculum including prerequisite allowances
- Curriculum of new course including references to state standards for technology education
- Letters in support of program development from local businesses
- Statements of support from potential students and parents for the program
- Initial budget or seed money needed to begin the program and possible grants or donors who might assist

Cardinal Manufacturing workshops are hosted at least twice per year. If you are interested in attending to learn more about how to replicate the program. Go to our website as we will be setting the date for the next one soon.

To download the entire guidebook go to [cardinalmanufacturing.org](http://cardinalmanufacturing.org).

[www.esschols.k12.wi.us](http://www.esschols.k12.wi.us)  
(715) 695-2696



This is an essay entered in our Dream Career Essay Contest 2015. It was selected as a Special Section Recognition Award recipient. Way to go Marc!

## My Dream Career: Pipeline Welding

Marc B.  
Cornell School District

My dream career is to travel around the United States and work on an oil pipeline. I chose this topic because I have a strong interest in welding. Next year I plan to attend a nearby technical college for their 2 year welding program.

Pipeline welders average from \$30,000–70,000 a year depending on the skill level, and position. Pipeline welders are responsible for aligning pipe, and welding the pipe together. After the pipe is welded the weld is visually inspected by an inspector to prevent future oil or gas leaks.

I chose pipeline welding because I have a strong interest in welding. My sophomore year I took a welding class the Cornell high school and absolutely love welding. Pipeline welders use a process of welding and SMAW or also known as stick metal arc welding. In stick welding a welder makes three different passes around the pipe using different rods conducting the level of penetration on each pass. Another process called GMAW, or gas metal arc

welding consists of a wire feed welder where wire is used as a filler rod, and the argon gas is used to protect the weld. These two processes are the most common welding processes.

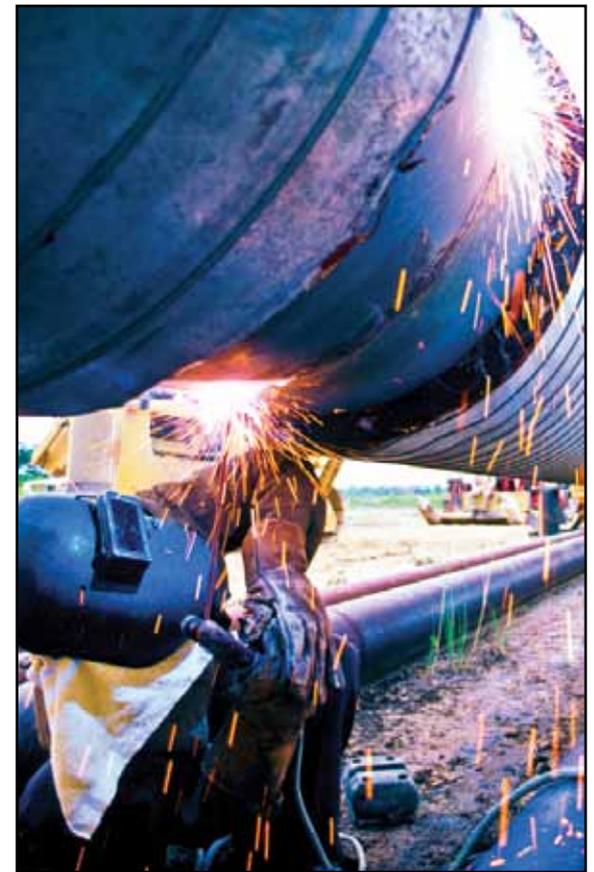
Two other forms of welding include TIG welding, and oxy acetylene. TIG welding, or also known as tungsten inert gas welding. TIG welding requires a steady hand to produce quality work, and unlike other welding practices rig welds does not produce a slag on the metal. Oxy acetylene requires argon and oxygen to weld bitter, and thin metals.

Other forms of welding careers are mainly held in factories, and machine shops. Welding metals like stainless steel for the dairy industry is a huge business because most of the pipes used to transfer milk and other liquids are contained in a stainless steel tank or pipeline. Other forms of stainless steel welding can be found on work bench tops, tables, auto parts and many other industrial uses. Aluminum welding is similar to stainless steel welding, but is a thinner metal. Items that

require aluminum welding are also in auto parts, benches, tables, boat lifts, car rims, grills, tool boxes and just about anything that pieces aluminum together. Steel is the easiest form of metal to weld on. The auto industry relies on steel welders to weld frames of cars together to support the body.

I chose welding as my dream career because I spend a lot of my personal time in the Cornell high school shop welding pieces of steel together with a wire feed welder, or a stick welder. Overall welding is a good career because it teaches many skills needed off the job. Welding is a well-paying career, but unfortunately the welding career is only temporary. Overall I would recommend welding to hands on type of students who are willing to learn a good trade.

[www.cornell.k12.wi.us](http://www.cornell.k12.wi.us)  
(715)861-6947



Read more entries in the 2015 Dream Career Essay Contest in the Winter 2015-2016 Vol. 1, and Winter 2016 Vol. 2 issues of Teaching Today WI. See them online at: [www.TeachingTodayWI.com](http://www.TeachingTodayWI.com).

## High School Manufacturing in the 21st Century

Continued from Page 14



2015 Manufacturing Month tours took Badger students through a manufacturer of polyurethane wheels, polyurethane tires and polyurethane profiles, and a medical device and contract manufacturer. At each facility, the president took the time to personally address and tour the students through their plant. Through the tours, students are learning that math and problem solving are key skills. “We are hearing that it is not just how to do (math),

but given a problem knowing how to solve it using math,” Geissler said. To support that in class, student projects require them to do lots of problem solving in selecting materials, identifying the correct processes to form the metal, designing a jig and calculating waste.

While on tour, students learned the relevance of project coordination. For example, at the manufacturer of polyurethane wheels, they plan their work about 6 months in advance.

Proper planning insures workflow. “Kids can relate to that in their chopper projects. They work in teams and don’t want to have to wait around for others to do their part so they can move on,” Geissler explained. The tours help the students see this process on a bigger scale.

Zachary Wiles, a junior in Production Careers in Metals, aims to be an engineer. “Going to all these local employers has helped me realize there are many opportunities in this field and that manufacturers (have a) high demand for engineers,” he said. He knows now, too, that the jobs pay well! Zachary finds one of the most significant revelations of the past tours, though, is an awareness of products made in our county. “There are a lot of (local) manufacturing companies that produce different types of products.” Geissler said students are noticing these manufactured goods when they are out in the community and see chairlift gears at the local ski hill, syringes at a doctor’s office, wheels on carts at school, and other products that they have seen manufactured first-hand. They are also realizing how far-reaching some of these products are, for example parts manufactured for the military in Elkhorn are in use by the U.S. Military, worldwide.

### Impacting Futures

And there has been an impact on students in the classroom, too. Zachary noted that there was a good deal of attention placed on safety at every facility. Students take the MSSC Safety course and exam in preparation for the world of work. Geissler has seen an impact on students’ career choices since the tours began, too. “I had one student who wanted to be a pilot, decide on manufacturing after going on a tour,” said Geissler. The tours make kids think about working here and making their own mark on manufacturing, whether making parts for an automotive plant, the military, a chairlift or wheels on a cart.

So while the choppers are being finalized, seniors are making plans for the world beyond Badger High School. And many of them are choosing to stay right here and work.

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# CAREER CENTER

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- Industrial Machinery Mechanics
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- Information Technology Project Managers
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- Mapping Technicians
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- Medical Equipment Repairers
- Medical Scientists
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- Nuclear Engineers
- Nuclear Power Reactor Operators
- Occupational Health and Safety Specialists
- Outdoor Power Equipment and Other Small Engine Mechanics
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- Precision Instrument and Equipment Repairers
- Robotics Engineers
- Robotics Technicians
- Sales Managers
- Sales Representatives
- Sawing Machine Setters, Operators, and Tenders, Wood
- 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.manufacturingtodaywi.com](http://www.manufacturingtodaywi.com)

## Dynamic Tool & Design Getting Younger and Younger

Continued from Page 13

cost of Mike's wage for those 250 hours, the cost for the Apprenticeship class tuition, helps create a succession plan for Dynamic Tool, and also frees up more time for Mike to work toward his 9,824 hours of on-the-job learning," said WCTC Dean of Applied Technologies Mike Shiels.

DEA, which began as a pilot program in fall of 2013, allows high school seniors to earn technical college credits while they develop in-demand skills to enter the workforce. Currently, program options include Tool and Die/CNC, Welding/Metal Fabrication, Printing and Publishing and Baking and Pastry Production. The program is a collaboration between WCTC, eight local industries and thirteen high schools. Ninety-five percent of this year's DEA trainees graduated from the program, and 83 percent of the graduates gained employment upon graduation.

### About Youth Apprenticeship to Registered Apprenticeship

Authorized by state statute since 1991, Wisconsin's Youth Apprenticeship (YA) program is a nationally recognized work-based learning model operated by the Department of Workforce Development (DWD) and regional consortium partners to help high school students gain academic and technical college-level instruction in a hands-on learning environment with mentored on-the-job training in an occupational area of interest over one or two years. Students who complete the program graduate on track, earn a YA completion certificate, and may receive technical college credit and industry credentials. YA provides youth with the skills needed for postsecondary education and employment success, includ-

ing Wisconsin Registered Apprenticeship (RA) program opportunities with employer commitments to hire and train certified skilled workers through related classroom instruction and work-based learning under the supervision of experienced journey workers. Find more information about YA and RA at these websites:

**Website:** [www.dwd.wisconsin.gov/youthapprenticeship](http://www.dwd.wisconsin.gov/youthapprenticeship)

**Website:** [www.dwd.wisconsin.gov/apprenticeship](http://www.dwd.wisconsin.gov/apprenticeship)

### About Waukesha County Technical College

Waukesha County Technical College, the leader in workforce development, prepares learners for success within the region and global economy. The college serves

nearly 24,000 students annually and offers areas of study including associate degree, technical diploma, apprenticeship and short-term certificate programs. Customized training is also available for employers. To learn more, visit the site below.

**Website:** [www.wctc.edu](http://www.wctc.edu)

### About Dynamic Tool & Design, Inc.

Dynamic Tool & Design Inc. is a global, plastic injection mold manufacturer located in Menomonee Falls, Wisconsin. In business for 39 years, Dynamic Tool & Design, Inc. is a technological leader within the industry. Dynamic Tool & Design is an employee-owned company. Visit the site below.

**Website:** [www.dyntool.com](http://www.dyntool.com)



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