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# PRECISION MANUFACTURING

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COVER

# *Pathways to Success*

**In a world that's going digital, young voices and industry innovators are getting hands-on to shape a new face for the manufacturing.**

By Jaimee Barnhart

Andy Angel, Small Engines and Welding teacher at Centennial High School, reviews a project with a student



Students in Andy Angell's Small Engines and Welding class at Centennial High School aren't likely to be found watching a Powerpoint or cramming from a textbook on a typical school day.

Instead, Angell said, his goal is for students to be as hands-on as possible, practicing the real-life applications of what they learn on a daily basis.

On a typical day, students are split up into rotating groups that focus on different aspects of manufacturing, including welding, CNC machines, manual mills, and machining. At the end of each class, Angell said, the students have a round-robin discussion to talk about what worked and what didn't.

"We've been lucky enough to get to do some really cool projects with the help of local companies that have supplied us with material donations and tooling for our machines," Angell said. "That has opened up a lot of opportunities for the kids to do hands-on projects and try out new ideas."

An Andover native, Angell has always been passionate about trade education. In his 12 years teaching at Centennial High School (the only school he's ever taught at), Angell has morphed what was once an elective-only technical education class into Manufacturing Pathways, a four-year program that prepares high school students for a career in manufacturing.

Once students graduate from the program, they'll have an OSHA-10 certification, which shows they've gained mastery of safety and health standards in the general industry workplace. As they continue to grow, Angell said, he'd love if the program could offer additional certifications in technology like Computer-Aided Design (CAD), Computer-Aided Manufacturing (CAM), and National Institute of Metalworking Skills (NIMS) which would set students up for even further success.

## Future Faces

The program is still relatively new — its first round of students are still working their way through its four courses, which ideally provide them the opportunity to have a hands-on manufacturing experience in each of the four years of high school, Angell said.

"The goal is that once they graduate, they've got the skills that they need to jump into training at an entry-level job," Angell said. "Ultimately, the primary goal here is to spark interest and get kids really excited about all the different



CHS student Tyler programs a CNC mill

opportunities there are in manufacturing, and help them find their way after high school."

For students like Tyler, the manufacturing pathway has been a career-shaping experience as he's discovered new passions that are fueled by his natural gravitation toward engineering and math. After taking one engineering class with Angell, he decided to take another manufacturing course his senior year.

"Mr. Angell helped us learn to walk so we can run," Tyler said. "He gives us

a basic understanding of the [machines and techniques], and then we design our own projects and [practice the skills he's taught us]."

Tyler's classmate, Dylan, has always loved working with cars and even has a part-time job at an auto shop. Dylan said he's been able to apply what he's learned about welding to his job there, which has sparked an interest in how the automotive and manufacturing industries go hand in hand.

"When I first started taking the class, I thought, 'Oh, it's probably just gonna be some welding,' but it's a full experience and you get to go into everything," Dylan said. "You can pretty much weld and create anything you want."

Dylan said he's found a lot of satisfaction in being able to create something out of raw materials in Angell's classroom.

"I love having the ability to take something like a sheet of metal and turn it into a 3D object, like a tractor bucket or some random square piece of aluminum and turn it into a steering component," Dylan said.

## Beyond high school

One thing Angell hopes his students will come away from his class with is the knowledge that there are endless opportunities within the manufacturing field, he said.

Junior Danny is still surveying his future career options, but he's interested in some alternative career paths within the field, including underwater welding.

"This program opens up so many opportunities for us," Danny said. "When I joined freshman year I had no clue I would be passionate about this, and I didn't really have an outlook yet for life after high school. After going through this program, I have my heart set on multiple different goals, and I owe that all to Mr. Angell and this program."

Danny's father, Tom, echoed that Angell has made a huge difference in Danny's high school trajectory.

**“Ultimately, the primary goal here is to spark interest and get kids really excited about all the different opportunities there are in manufacturing, and help them find their way after high school.”**

- Andy Angell

“Danny’s got a lot of really great teachers at the school, but I do think that Mr. Angell has been one of those shining stars,” Tom said.

Tom, who works in the corporate world, has always encouraged all three of his sons — Danny included — to pursue a career they are passionate about. He’s loved seeing Danny get curious about

a variety of career paths. To parents whose kids are interested in taking a manufacturing pathways course like the ones at Centennial, Tom says, “Do it.”

“I think every kid should take classes in the trades — and right now there’s far too many boys doing it and not enough girls,” Tom said. “We all touch engines every day, regardless of whether or not we work in the manufacturing field, and we should know the basics and fundamentals of how they work.”

Angell’s class is all about that real-life application aspect. After years of being a “squeaky wheel” sharing about the benefits of classes in the trades with administrators, Angell said, his dream of preparing his students for life after high school is finally gaining momentum.

“I really hope they see that they have endless opportunities in the area of manufacturing if they choose to go that route,” Angell said. “I try to create problem solvers in my class — there’s millions of ways to do anything, and I try to create an environment of learning.”

And, as Angell pointed out, there’s never a shortage of things to learn in the manufacturing space.

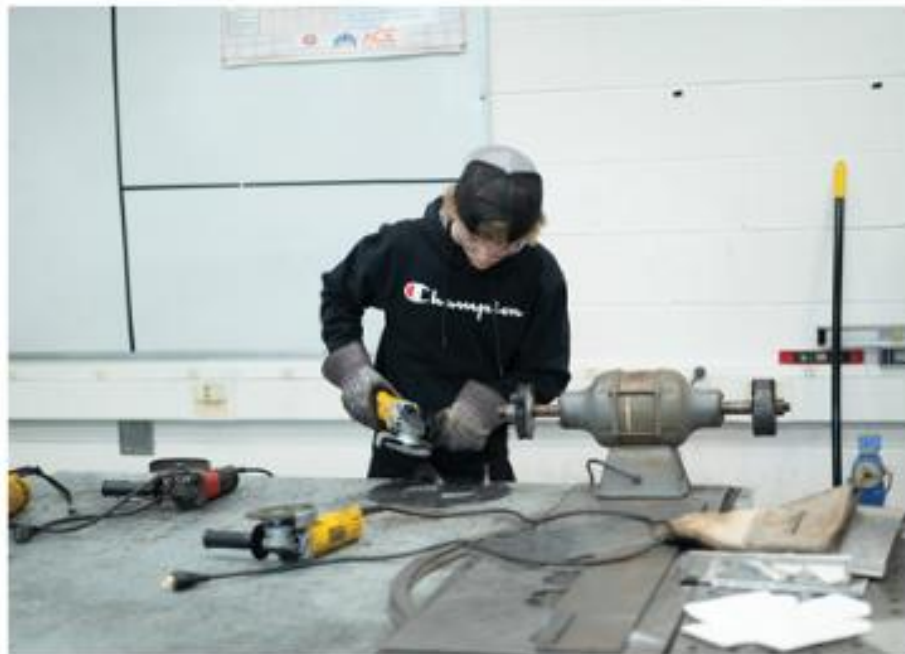
“We could only do a limited version of what we do without the help of local companies and manufacturing communities around Centennial,” Tyler said. “We get a lot of help and assistance from businesses just right down the road that have donated sheet metal, tools, and helped facilitate the projects we get to do.”

“Until we’re given a shop and material to practice with, it’s all just a concept in our minds. We can learn all the theory we want, but once you step into that shop and make your first part or your first engine, that’s when the spark goes off.”

To learn more about partnering with the Manufacturing Pathways Program at Centennial High School, contact Ben Fuller, assistant principal, at [bfuller@isd12.org](mailto:bfuller@isd12.org).



Students in Mr. Angell’s class work with a manual mill, thanks to donations from the MPMA Education Foundation, rms, PackEdge, Twin City Fab, and MC Metal Fab.



A student in the Manufacturing Pathways Program finishes his final project of the school year

Photos by Emma Gortschak