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BUILDING FUTURES EXPANDED ISSUE ONLINE!

More stories and more photos can be found at djcoregon.com/building futures! In this expanded edition, also learn about Forest Grove School District's Career Day, Forest Grove High School's Machine Manufacturing Program, Canby High School's activities and the Sabin-Schellenberg Professional Technical Center.

THINK GREEN AND STAY ON TOP OF THE NEWS!

You can receive your copy of Building Futures electronically. To join the e-list, send your email address to Tom Goodhue, OBC executive director, at tgoodhue@obcweb.com.

Welcome **From Executive Director, Tom Goodhue**

The Evolution of 'All'

Tom Goodhue

This issue I am electing to share with you some thoughts on education that represents many of the roadblocks in developing a world class system here in Oregon. Below is a commentary I received from Kyle Laier, who is the principal at CAIS (Clackamas Academy of Industrial Sciences). As an educator he discusses the need for a commitment to a paradigm shift in the way we teach students. Please read, enjoy and become involved with OBC to make a change.

Over the past 50 years, there has been a consistent political focus on our educational system being broken and in need of significant reform. Many efforts to reform our school system and better prepare students for the future have come and gone during this time. If you've spent any time this past decade following educational research, listening to reformers or tracking school initiatives, you've heard reference to schools ensuring that ALL students learn. Not only have we called for ALL students to learn, but also often we've rallied for them to learn at high levels. I myself have been an advocate for many of these efforts, but am often perplexed by our laser-like focus on a few areas in effort to prepare ALL students for the diverse opportunities *their* future offers them.

In recent efforts to prepare ALL students for a successful future we have focused on a few measures that ignore the diversity of our society, economy and opportunities. Legislators have voted through reforms such as No Child Left Behind with the goal of preparing ALL students. These efforts are honorable, but if we've learned anything, it is that these efforts fall well short of fully preparing ALL. Preparing our students only to meet the entrance requirements of a four-year college ignores the diversity of skills needed for today and tomorrow's job. You cannot narrow your focus to teaching students reading, math and writing while neglecting opportunities to apply employable skills of teamwork, communication and problem solving. Nor can you cut career-technical courses, art classes and business courses that inspire students to take advantage of their inherent skills and give them relevant opportunities to apply skills learned in core areas.

More detrimental is our measurement of ALL with test scores that have meaning, but are far from the full picture. They measure a student's ability to answer hollow math problems, comprehend passages trivial to the student and write on cue about prompts that lack relevance to their present or future. These are considered the measures of successful schools. States create report cards to rate schools on their success on these tests. In response to diminishing public investment and this focus, schools cancel important learning activities, discontinue electives and place students in remedial courses creating with the purpose of getting students to pass the test. Reactions to this type of legislation mugs ALL students of course opportunities that prepare them for their successful future.

If you don't believe our efforts to prepare ALL students are failing, look at our economy. There are many reasons for the recent economy, but one that relates directly to schools. I currently work with more than 50 employers, some are the largest employers in the state. Most of these businesses have jobs that they cannot fill. The reason: lack of a skilled workforce. Recent efforts to prepare ALL students are far from accomplishing the goal. They are only part of the solution. We need to be honest about the diversity of preparation our schools offer and the false hope our narrow measures report about our most important state product. It's time the discussion and funding went beyond preparing students for state tests and became about preparing ALL students.

BY BETH MOLENKAMP

Career Technical Education benefits students and industries

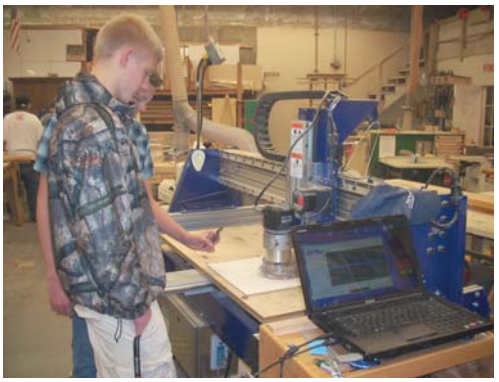
There are great things going on in our high schools and great kids doing amazing work. Chances are, that quality teaching and learning is part of a CTE program. What's CTE? Career and Technical Education! And CTE is designed to help give high school students the skills and education they need to be successful in careers, school, and life.

CTE programs recognize that even if students go on to college they'll need a job and good work habits. Nationally the on-time graduation rates of high school students are cause for concern. Lack of work-related skills and losing our jobs to overseas workers due to an unskilled workforce are all issues that cause concern.

High school students in CTE courses are helping us fill that gap. Nationally, on-time graduation rates are lower than most people want them to be at 79 percent. Oregon graduated 68 percent of its high school students in four years. (Oregon's high school graduation rate is the fourth worst in nation; no state graduates fewer white students on time. Oregonian, November 27, 2012, Betsy Hammond) Oregon's CTE programs are more successful. Oregon's CTE students' graduation rates are 82 percent; nationally, we see CTE students' graduation rate is more than 90 percent.

Equally problematic is the fact that employers often say that students don't have the skills they need to succeed in the work force. Additionally, certain industry sectors do not have enough new workers graduating from high school or college programs with the skills and work habits needed to ensure the success of that industry or to prevent loss of jobs to overseas workers.

In Oregon CTE programs are developing our most valuable resource – its people. CTE programs are developing skilled workers in specific focus areas: Agriculture, Food and Natural Resource Systems; Arts, Information and Communications; Business Management; Health Sciences; Human Resources; and Industrial and Engineering Systems. Within these content areas, students learn through hands-on, engaging learning experiences what that career focus area demands of its workers. Students leave the programs with practical, marketable skills, which increase their ability to compete for jobs.



In Gaston's CTE Construction program both young men and women get the opportunity to use industry standard equipment, work on authentic projects like furniture, and subcontract to build cabinets for a house that is going on the market in the Sherwood community. Students learn about project management, acceptable industry standards, and budgeting.

CTE programs often offer Dual Credit to their students as well. If enrolled in an approved Dual Credit program students earn high school credit for their class while they earn college credit for that course at the same time. This helps students earn credits toward a certificate or associates degree, shortening the amount of time they spend in college. It's a wise economic choice as well because it decreases the rate of personal college debt.

This dual credit experience is good for students and the state because it increases the number of students who attend college from 72.6 percent of graduates who attend college to 81.4 percent of graduates earning Dual Credit who attend. Students are also more likely to persist in college making it to that second year at a rate of 87 percent. Dual credit students also earn higher grade point averages.

The success of CTE and Dual Credit is important for Oregon to continue to develop a solid economic infrastructure. Both of these programs rely on industry guidance to assure that they are meeting current standards. Through regular interaction and advisory boards, programs work to assure that they stay current with industry standards, education and trends.

Beth Molenkamp is PACTEC/PCC Dual Credit coordinator at Portland Community College.

Are you looking at the future? At Tigard High School in the CTE Computer Science class students can take industry certifications during school that will get them a job directly out of high school. They program, they design, they test, they refine. These CTE students build robots for competition, for land, water and this year for air. You are looking into the future when you take this type of CTE program of study.

BY JON DICKOVER

Real-World Skills

Sherwood students tackle home-building project

The Bowmen House project is a compilation of several programs at Sherwood High School in Sherwood to design, build and sell a house on the open market.

The question has been asked several times, “How did the Bowmen House project come about?” The real answer is long and I usually give a pretty condensed version. However, I felt this time I would go into greater detail and explain the whole story.

The background of my personal life is that I grew up a jock. There was not very much in school that interested me except for sports. Woodshop, metalshop and autoshop were available when I attended Sherwood High School from 1987-1991, but I took weightlifting instead. I went to Linfield College where I played basketball. Still not really enjoying anything academic, I had to choose a major. I wanted to stay connected to athletics, so I went into physical education where I had some wonderful teachers who helped me become inspired and actually enjoy what I was learning. That is a brief look at my educational background, which mirrors many students in the world today.

In 2005 I was getting married and my paycheck was not enough to pay for a wedding. My fiance’s father was a contractor, so I asked him if I could work for him to help pay for my wedding. I really enjoyed the work. After my wife and I were married I continued to work wherever I could during summers, spring break, holiday breaks and weekends. With a child on the way in 2008, I started putting in more and more time working for various contractors and even doing some work of my own. It was the process of having a family of my own that I began to think of where I wanted to raise a family. Sherwood has always been a wonderful place, so I landed back in Sherwood. Sherwood was great for me as a youth and I knew it would be a great place for my new family. I have always thought the schools did a fantastic job, but with my newly found line of work I realized what Sherwood schools, at the time were missing.

Work on the Bowmen House is nearing completion, with an open house set for May 31. Community members are invited to visit and see what Sherwood High School students have accomplished collaboratively with hard work, dedication and creativity.

John Niebergall was the woodshop and drafting teacher at SHS while I was attending high school. He continued to teach Woodshop/Engineering and Architecture at Sherwood while I taught Middle School PE. I met up with him one evening and over the course of conversation we talked about starting a construction program at SHS. He said he would help me if I was serious and I was really excited about the possibilities. At this time, Tom Tannehill was a counselor at SHS. He had built a house with students back in 1981, but budget reductions in the ‘80’s caused the program to be shut down. So, we contacted him for advice before we went any further with this idea. A few weeks later the superintendent at the time, Dan Jamison, walked through the gym of Sherwood Middle School where I was teaching my PE class. I asked him if he had a second and he graciously listened to our idea. He ended the conversation by telling me that he loved the idea and that I needed to meet him in his office at my earliest convenience. I was expecting more push back, but the ball was rolling.

The following week, Mr. Niebergall, Mr. Jameson, Mr Lowry (district CFO) and myself were meeting at the district office. I was told to put together a presentation for the next school board meeting where we would pitch the idea and one month later, I was showing a Powerpoint of our dream and how I thought it could

benefit so many different students. The school board seemed to think it was viable and accepted my proposal. The next few months were spent researching how a program like this should be run. John Niebergall told me about Forest Grove High School, where I found the ideal program. I have yet to find a program that exceeds what they do. So, I have used them as a model for my construction program at SHS.

In fall of 2008 I moved from being a PE teacher at SMS, to being a woodshop teacher at SHS. It was a huge transition: learning how a woodshop is run, building an inventory of up-to-date equipment, developing the actual construction program where we built sheds to learn the basics of framing and siding. Kids really began enjoying this class and started becoming very excited about the possibility of building a house.

My wife is a real estate agent and became friends with an architect and his wife, Richard and Candace White of the White House Collection. As we began to prepare to build our first house, she contacted Candace who said they would love to help our school. In the winter of 2010-11 Richard and Candace began volunteering occasionally with Mr. Niebergall's Architecture class. They guided students on how to design the Bowmen House. They led the class and eventually hired one of the class "allstars" to work as an intern on the Bowmen House during spring break. After this, the class continued working on the design until we reached a point where Richard had to take over and put the final professional touches before it was sent to Engineering and finally permitted.

The following fall, my construction students returned to school Sept. 1 to find the foundation poured, ready for them to begin framing the Bowmen House. We spent the entire school year framing and siding the house. We have 70 minutes for students to get from the high school to the job site, roll out tools, work and put tools away so they can get back to the school to catch the bus or prepare for their after-school activities. During this past spring (2012), the Interior Design class also took the opportunity to use this as a real-world experience and chose the surfaces for the home.

The house sat empty and basically untouched over the summer with the exception of insulation and sheetrocking, and when the students returned this past fall, we finished up any outside necessities and began with the finish work inside the house. We continue to do the finish work while the Environmental Science class in the meantime has developed a landscaping plan to implement in the spring of 2013.

Another point of special interest is the cabinetry of the house. Sadly, there are not very many high school woodshop programs around any more, but during a discussion with Gaston High School teacher, Wade Sims, we came up with the idea for

BOWMEN HOUSE, continued on page 11

BY CHRIS HIGGINBOTHAM

Valuable Lessons

Viking House gives Forest Grove students opportunity to develop on-the-job skills

I have been a woodshop and construction teacher since 1995. One year during parent/teacher conferences, a first-year woodshop student's father came in with an interpreter and asked an excellent question. The interpreter hesitated a moment after hearing it, seemingly searching for the correct phrase, then said, "He wishes to know ... what good is it? What good is this class to his daughter? What is she learning?"

This father wanted to know whether a woodshop class would be a worthwhile use of his daughter's time. Coming from industry, I have always considered students' parents as "customers" who expect a certain result. In any type of class, it is important to avoid wasting the students' time, and to ensure that the class is doing some good for them. Cut out the fluff, get to the point, and do something meaningful. Run properly, vocational courses can offer specific knowledge in useful fields and a tangible product to represent the work a student has put in over time. The essential question is: once the class is over, what good has it done for the student?

To provide a clear answer to this question at the end of the semester, it is always my goal that a student finishes with a useful project they built with their own hands using industry-relevant equipment and procedures. The skillset required to build these projects promotes self-reliance by giving them a head start in maintaining the likely largest purchase of their lives, a home. For others, it may also lead into a possible career path, whether it is carpentry or one of the hundreds of professions associated with the construction of a house – the very reason it is used as an economic indicator. Either way, the sure thing is that each student has gained useful practical knowledge.

This year's Viking House crew has gained valuable skills. About half of the previous crew members have gone into industry-related careers, including carpentry, plumbing, roofing, HVAC, general contracting and architecture.

It has been my honor to run the Forest Grove Viking House program since 1998, in which a hand-picked crew of advanced construction students builds a single-story home for sale over the course of a school year. (www.fghsvikinghouse.com). The students who participate have been diverse in every sense, from backgrounds and interests, to beliefs and aspirations. What most have in common is a desire to do something more in school. They want to do something worthwhile, something they can see both a purpose and a result for – really the foundation of vocational education. There is a pretty steady stream of former crew members that makes their way back to visit the jobsite each year. In 2011 I kept track of who came by and counted almost 30, all with stories about their time here and what it meant to them.

About half have gone into industry-related careers. There have been several carpenters, electricians, plumbers, engineers, roofers, general contractors, HVAC techs, and at least one architect. All have expressed in some way the value of their experience here as a head start in their chosen fields. Even the more academically inclined students involved (we have had many very good students and several valedictorians) almost all claim the Viking House project as their most meaningful experience in high school. These students often speak of the confidence the Viking House gave them in taking on large tasks and the appreciation it gave them for their fellow students whose strengths were in the hands-on areas. Many also have pointed out how much the 15 articulated

credits with PCC for the program helped in getting a jump on their education.

One student in particular stands out that recently graduated from OSU's Construction Engineering Management program. He gave an inspiring talk to the current VH crew about how his experience helped him to gain immediate upperclassman privileges in the OSU program. He also spoke about the many intern and scholarship opportunities that allowed him to graduate debt free with many employment opportunities. In fact, he said the employment rate for that program is more than 95 percent with the undergraduate degree. I am excited for the students that have expressed interest in enrolling in the program.

For the many that have gone into the trades, all hit the ground running with real marketable skills valuable to an employer. Being job-wise, safety conscious and understanding how the structure goes together set them apart from other applicants. Not to mention an impressive skillset for their young age make them outstanding apprentices. One tested out as the number one ranked plumbing apprentice in the state of Oregon years ago and now manages a large plumbing company. Two students from last year's crew recently took their written tests and interviews for union electrical apprenticeships. Out of more than 600 applicants, many older and currently working on jobsites as laborers, they ranked 4 and 5. They are currently in the basic training class for the apprenticeship and say the next youngest person in the class is 25. They credit their vocational courses at FGHS in metals, woods, construction, (and auto and drafting cut last year due to budget reductions) for giving them a distinct advantage in their placement. Several others have pointed to the Viking House program as the reason they were hired by contractors. For some it led to them being general contractors in their own right in short order. One student (VH2006 & VH2007) has acquired and renovated several rental properties with his brother (VH 2003) and others have told similar stories about flipping houses and making very good livings.

For the many that have gone into the trades, all hit the ground running with real marketable skills valuable to an employer. Being job-wise, safety conscious and understanding how the structure goes together set them apart from other applicants.

For vocational education, the threat of budget cuts raises the stakes when it comes to making classes as effective as possible. All parents want that original question answered: "What good is it?" These courses have the opportunity to provide unique, valuable experience to young people during their high school education. And it is clear that this experience has vast practical application in the real world. In my opinion the foremost goal of a high school should be to assist students in becoming productive members of society, and vocational programs are our most powerful tool in achieving that. That is the good of it.

Chris Higginbotham is the construction and wood shop instructor at Forest Grove High School.

BY JAMI DUYCK

Machine manufacturing program offers pathway to job opportunities

What used to be the industrial arts programs at Forest Grove High School have gone through a tremendous amount of change during the past few years. What are now called Career and Technical Education, or CTE, classes consist of woodshop, metal shop, and agricultural science classes.

Machine manufacturing is a series of four classes in the metal shop. The introductory class exposes kids to a wide variety of metal processes including arc welding, oxyacetylene welding and cutting, bench metal, and basic shop safety. As students move through the program they gain experience in SMAW, OAC, GMAW, GTAW, lathe work, and milling.

During the past five years students have worked on two trailer projects: a hydraulic dump trailer for the agriculture department land lab, and an equipment trailer for a local FFA alumni member.

Last year we had the opportunity to start a partnership with Oregon Iron Works, in Clackamas. OIW has opened their campus to us for field trips, sent professionals into the classroom to teach a class for a day, supplied materials and projects for students, and connected students to job opportunities. The long-term goal is to provide students who have a passion for the metals industry a direct pathway from graduation to a career.

Due to our partnership with OIW we have also connected with the Local 516 Ironworkers in Portland. We have guest speakers come out for the day and talk to kids about how apprenticeships work, have kids actively participating in hands-on demonstrations, and last year we had a new piece of equipment set-up during class so the students could use it.

High school kids are really looking for options after high school, not just a path to college. Industry partnerships are sparking interest and getting kids involved and wanting to know how they can be a part of it.

Above: Senior Cameron Sahnow (left) and senior Trevor Glynn work on the lathe on their meat tenderizer.

Kids that participated in an all-day class with a machinist from Oregon Iron Works and the project they did on the lathe – a meat tenderizer.

Above: Student John Cunningham works on his project, the sidehack. Below: The finished sidehack.

Senior John Cunningham said, “Thanks to metals I now have a plan for my future.” John plans to apply at OIW and transfer into the Local 516 Ironworkers apprenticeship, all connections he made by actively participating in the manufacturing program. John also completed his senior project using skills he learned in class, designing and fabricating a sidehack for his bike. John bought a sidehack from Walmart when he was a junior and decided he didn’t like the design, so he built

The Forest Grove High School welding and machining team that competed at the Linn-Benton Community College Industrial Skills Contest on March 7. Trevor Glynn won 3rd place in the GTAW contest, winning a welding helmet and jacket. The students competed in GMAW, GTAW, SMAW, General Welding, and turning contests.

one. After the first one, he decided he could make a bigger and better one, so he built a double sidehack.

Other students involved in the metals program have similar passions. Senior Tanner Aust said, "I really enjoy coming to metals class, it is the only reason I like to come to school on the days I have metals." Junior Kenneth Ridenour said, "Being able to come to metals class gives me motivation to come to school and attend my other classes." Senior Eli Gunther said, "Metals is the best class I have taken at Forest Grove High School."

The drive behind the machine manufacturing program is to expose kids to skills and careers that they may not experience otherwise. There will be thousands of jobs in the trades in the United States in the next five to 10 years, and we need young workers to fill those jobs. The goal is to help kids that have a passion for working with their hands and are looking for an alternative to a four-year university find a path that works for them, and will lead them to a high-skill, high-wage career.

Senior Erin Carlson arc welding.

Jami Duyck is the welding and manufacturing instructor at Forest Grove High School.

BOWMEN HOUSE, continued from page 7

his class to build the Bowmen House cabinets. This has proven to be a very successful endeavor as his class has done a great job of producing professional quality cabinets.

Needless to say, although I am spearheading this project, there has been a tremendous amount of help from industry and community members. Many people and businesses have volunteered their time and efforts, others have been very generous in helping with donations. It is difficult to list all of the donations at this time as there are so many. Some of the major contributors, excluding individuals, have been: Malarkey Roofing Products, Fisher Roofing, Fireside Distributors, NW Painting and Construction, LLC., Koeber Floors, The McCabe Real Estate Group and others. I believe they see the tremendous value in a school-wide project that integrates real-world situations and learning into a much-needed curricular area.

It has been a joy to watch students realize all the different career fields that are directly influenced by construction and the trades. Students often come back after graduation to see how the house is progressing. They contact me to ask, "How is my house coming? Your class hasn't messed up the room I built have they?" The ownership and pride they are taking is commendable.

We are on schedule to be completed and hosting an open house May 31, 2013. I welcome all community members to come visit The Bowmen House to see what the students of multiple classes at Sherwood High School have accomplished collaboratively with hard work, dedication and creativity. As a parting message, I want to really emphasize the work of the entire student body and community. The partnerships of the administration, teachers of various areas (Architecture, Interior Design, Construction, Newspaper, and Cabinetry at Gaston High) have made this truly a collaborative project that can be and will be sustainable and successful.

Jon Dickover is the construction teacher for the Bowman House at Sherwood High School.

BY CONNIE POTTER

Students encouraged to 'Soar with Dreams'

On Saturday, March 2, the Forest Grove School District hosted its annual *"Soar with Your Dreams"* career conference held at Pacific University. The event serves students in grades 5-8 with surrounding districts invited to participate. The conference was started 15 years ago as a way to get students thinking about their future, setting goals and doing what it takes to reach those goals. They tell kids to dream big, that they can be anything they want to be if they just put in the planning and work to make it happen. The district chose to hold the conference at Pacific University to also give the kids a taste of college life.

The conference has grown from about 35 kids the first couple of years to more than 180 this year. That's pretty amazing since it's held on a Saturday when it competes with kids' sports and other activities. The event is fun as well as educational, with pizza, prizes, snacks and giveaways. The kids have a ball, and a large number of them come back every year they are eligible.

The day starts with a keynote presenter, then breaks into small, hands-on career sessions. The hands-on is what makes this conference different. Instead of listening to someone talk about his/her career, the kids get to do and see activities related to that career. At the carpentry session, students learned to use a tape measure. For the construction labor session, they built a scaffold. For the dentist session, they put on gloves and face masks and examined each other's teeth and practiced giving shots on oranges. For the chef session, they chopped ingredients and made salsa. For the law enforcement session, they dusted pop cans for fingerprints and conducted an investigation.

Students got to attend four different career sessions during the morning (choosing from nine different offerings each session). There were 36 career sessions in all. A variety of careers were offered, from the trades to white collar jobs. The conference tries to offer a new mix of careers every year. The kids seem to love them all. One of the interesting things is that every single career gets at least a few mentions on the evaluations as someone's favorite of the day.

The evaluations are always really positive. Here is a sampling of the comments:

What I liked best about Soar With Your Dreams:

"I liked that I learned a lot about construction. Plus they explained it clearly."

"I liked all the hands on stuff we got to do, and all of the stuff we learned."

"The nice people, making new friends, and career lessons."

"I liked how most of the sessions weren't boring. They were fun."

"I got to learn about all sorts of careers to help me decide what I want to do when I grow up."

"I loved it all."

What I liked least:

"Nothing. I loved it all."

"I actually liked everything."

"I don't really know because it was all so fun."

"That it had to end."

Thanks to Bob Calwhite with Pacific Northwest Carpenters' Institute and Aida Aranda with Oregon Southern Idaho Laborers-Employers Training Trust for graciously donating their time to work with students at this years' event.

Connie Potter is the chief of staff/communications director at the Forest Grove School District.

Forest Grove School District's Career Day features a variety of hands-on activities for 5th-8th graders to explore.

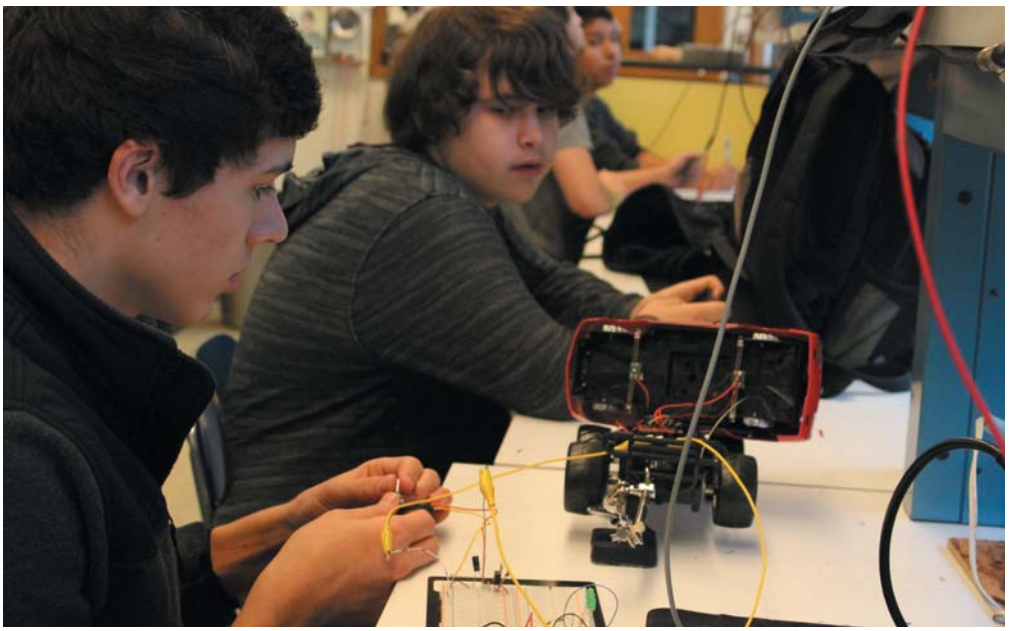
BY JULIE COLEMAN AND KAREN PHILLIPS

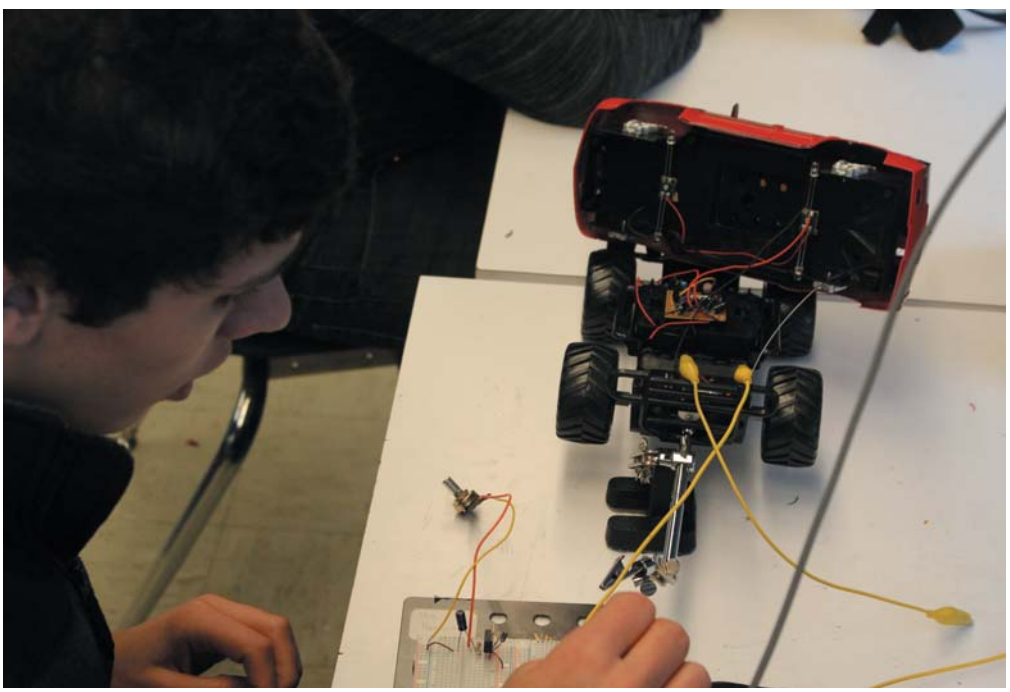
Sabin-Schellenberg Center – Preparing tomorrow's leaders today through innovation and application

Located in Milwaukie, Ore., in the North Clackamas School District, the Sabin-Schellenberg Professional Technical Center (SSC) currently offers high school students a choice of more than 60 elective classes in 15 different career fields. Many of the programs offered provide students with STEM (Science, Technology, Engineering, and Math) skills. Students learn STEM skills in Agriculture, Automotive Service Technology, Computer Aided Design, Digital Design, Electronics Technology, Forestry, Health Services, and Manufacturing & Engineering. All programs have college articulation allowing students to also earn college credit at area community colleges. Additional learning opportunities are provided for students in these STEM programs through after school leadership organizations that connect students with adults in industry: SkillsUSA, Forestry Club, FFA, Scrub Club, ACE Mentors, and FIRST Robotics.

SSC's latest student leadership organization is a FIRST Robotics team, the Sabin Sharks. Electronics and manufacturing students meet several nights a week to design, build and program advanced robot machines used to compete in the FIRST Robotics Challenge Regional Competition. Team meetings are fun, fast-paced events where the Sabin Sharks' three sub-teams (Mechanical, Electrical, and Programming) create their individual pieces of the puzzle. Each sub-team is a highly specialized group consisting of several students with training in their specific area; team members apply their STEM skills each time they meet.

The mechanical team designs, cuts, welds, and assembles all the large physical items for the robot. They build the frames, subsystems, and devices that will later be controlled by the other two teams' creations. The Electrical team handles all things having to do with electricity and the manipulation of power. They build circuits and manage power distribution. The Programming team exists as a base for the robot. Programming is done in the "LABView" language, which drives the electrical team's designs, which in turn determine mechanical's constructs.





Eleven Advanced Electronic students are currently working on the modification of radio-controlled cars. The assignment? Take a standard remote-controlled car, gut it, use its chassis and motor, then engineer the unit by developing a remote control and circuit boards.

The initial FRC (FIRST Robotics Competition) challenge in 2012 was to design and build a basketball hoop-shoot-

ing robot from start to finish, all within a six-week period. As a first-year team, students received a slightly larger than usual kit of parts. However, FRC kits are no simple assembly job. Kits contain a large amount of unassociated parts with no explanation or guide of any sort. What to use and where is completely up to the team members. Often students bought different parts or built their own devices entirely. The finished robot must meet very specific weight, height, width, and overall size requirements and still be able to collect foam basketballs, shoot them through baskets, and balance with another robot on a small bridge for bonus points. The final product was a 120-pound, tank-driven, basketball-firing masterpiece costing more than $10,000. This was made possible by generous contributions from SSC business partners ODE and NASA. Overall, the team did very well in its first FIRST competition.

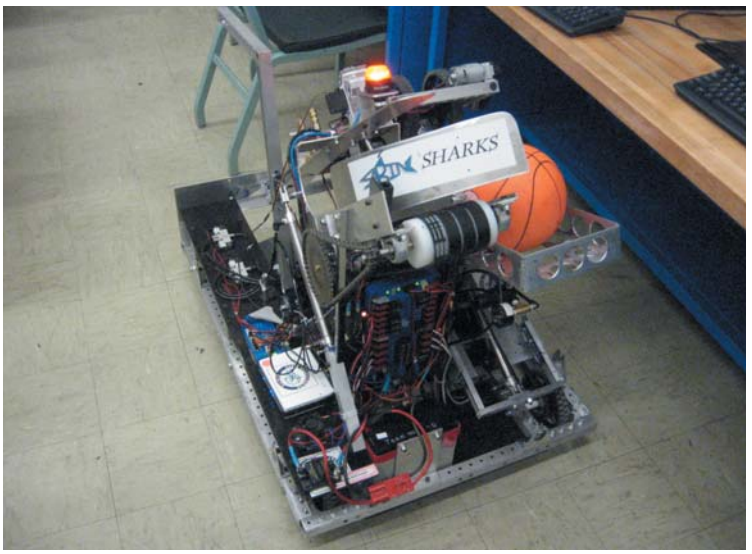
This winter's 2013 FRC competition challenge was to build a robot capable of shooting frisbees into small goals, in addition to be able to climb a large pyramid to a point over 2 meters in the air. Designing a system that can lift its weight and not drop the machine was definitely a difficult challenge. "It is definitely a lot harder than the one last year, but that's what makes it fun!" says team leader, Nick McComb. Online chatter between older teams seems to confirm that this year was the hardest FRC challenge to date.

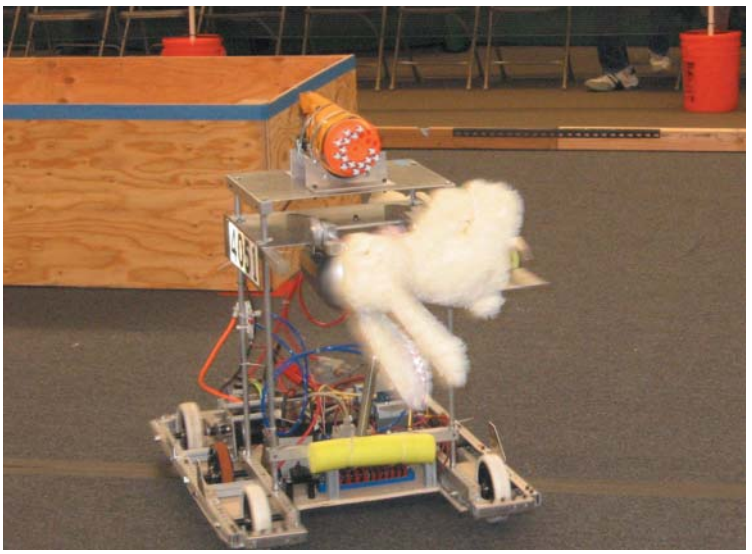
In their second year, the team received a smaller kit; in order to stretch resources, students incorporated 2012 robot components into the design. The team tripled the number of business partners, as Wahoo Waffles, Blount, Cranston Machine, Les Schwab, G.T.S., Apollo Chemical, and Septiclear all helped to ensure students had the resources and support to build a great robot.

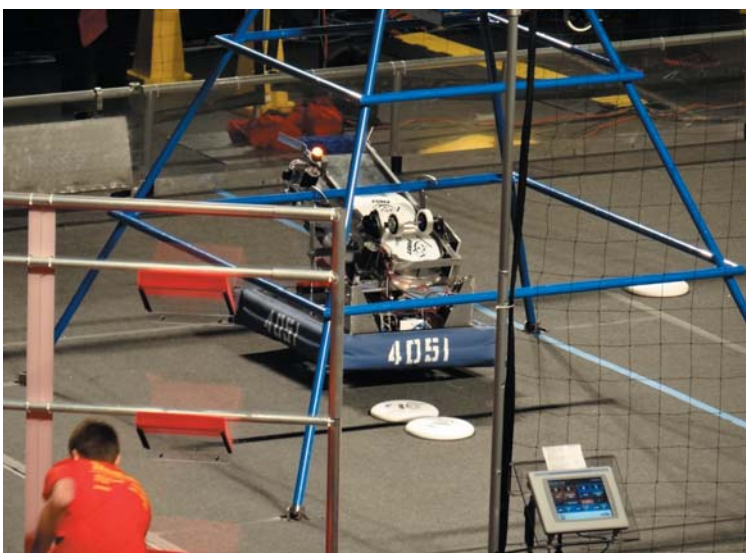
FRC Robotics after-school club is not the only time students can learn about and apply the skills related to robotics. The SSC fourth-year Advanced Electronics students have been gaining skills and knowledge, preparing for this type of challenge, working 60 minutes every day applying math and learning to engineer electronic devices. Electronics Technology instructor, Wayne Sellevaag, teaches both at the high school and at the college, thus ensuring students are learning the skills and knowledge they need for post high school education. Advanced Electronics students receive four college credits at Clackamas Community College for EET254 – Introduction to Microprocessors.

Eleven Advanced Electronic students are currently working on the modification of radio-controlled cars. The assignment? Take a standard remote-controlled car, gut it, use its chassis and motor, then engineer the unit by developing a remote control and circuit boards. The first step in this process is to test the vehicle's parameters: speed, current drawn, forward and reverse acceleration, braking, and turn radius. During testing, students determined the speed of the vehicle was too fast and developed a pulse width modulated voltage regulator to control it.

Based on test results, students each selected their vehicle of choice, radio car or truck. Then the work began in earnest.







SSC's latest student leadership organization is a FIRST Robotics team, the Sabin Sharks. Electronics and manufacturing students meet several nights a week to design, build and program advanced robot machines used to compete in the FIRST Robotics Challenge Regional Competition.

Working with their own drawings and schematics, students developed H-bridge transistor circuit boards to control the vehicle without changing the wiring; infrared optical sensors for the front end to keep vehicles from running into anything; and a three sub-program sound sensor (controlled by clapping) to change vehicle direction or speed. Then students calculate the voltage input and output required for all of these sensors. The next step is to put it all together on the main circuit board.

Utilizing the PIC 16 F84A 20-pin socket microchip processor allows students an infinite number of options; students can breadboard, test and reprogram as needed to perfect their design. Several weeks were spent learning the PIC microprocessing programming code and conducting labs to make lights blink and turn motors on and off. This is definitely a student driven project ... every design is as unique and individual as the student developing it. As Sellevaag stated, "This class is challenging and fun for me as well. I get to figure out what students' were thinking in order to help them problem solve on their own design."

Certified Career-Ready

Another opportunity for students to apply and strengthen their STEM math skills is in the SSC Manufacturing and Engineering program. In 2012, welding instructor Mark Lynch spent his summer earning his certification as a welding educator and inspector. His goal: to provide a welding certificate program to interested juniors and seniors in the Manufacturing and Engineering program.

Through a rigorous application and interview process, seven students were accepted in the program the first year; five of them received their American Welding Society (AWS) D1.1 certificate by year's end. "IMR Test Labs came to SSC and supervised the physical testing," explains Lynch, "then took the physical samples and tested them in their lab." Throughout the year, students worked on assignments and learned safety out of the code book, learning welding symbols in order to write their own welder procedure specification for their test. In order to get enough time welding, students had to commit to spending all class time, two-and-a-half hours every other day, and time outside of class

At Sabin-Schellenberg, they strive to ensure that students graduate with the skills to be career ready; now students can leave with a certificate that proves it.

working toward their certification test. "I always knew the kids could do it. I was really happy when they passed; some had to test twice, but they did pass," says Lynch.

Now in its second year, eight students are working toward their certification test. Four of them returned from the first seven, and are working on a second AWS certification. Asked what drew him to the welding certificate option, Devin, a fourth-year Manufacturing program student replies: "I never wanted to go to college, but wanted an option to get a job right out of high school that would pay above minimum wage. And I could use it to pay for school should I decide to go."

At Sabin-Schellenberg, they strive to ensure that students graduate with the skills to be career ready; now students can leave with a certificate that proves it.

Co-written by Julie Coleman and Karen Phillips.

BY JAY ETNIER

Pumpkin Chunkin'

Firing gourds at a target tests mechanical engineering skills

The Oregon State Pumpkin Chunkin' event is growing in popularity and quality each year. For the past two years Sam Barlow students have entered the event, as well as teams from Centennial and Nestucca – this past year Willamette and the ACE Academy also competed.

The event is held each year at the green space adjacent to Southwest 11th Street and Northwest Monroe Avenue in Corvallis, and run by the Oregon State University Chapter of The American Society of Mechanical Engineers, or OSUASME. The event started several years ago, but has been attended by high schools students for the past two years; each year better attended than the previous. Further, the contest is a grand opportunity to travel to a college campus, compete against other schools, and most importantly engage in some compelling engineering.

The idea, as indicated below, is to shoot a pumpkin 30 yards at a specific target; accuracy and consistency count. Additionally, a team can garner greater reward by heaving heavier gourds. The work put in by students to engineer (design, build, test, modify, test again, and again) and finally compete is a valuable and educationally sound endeavor.

The idea is to shoot a pumpkin 30 yards at a specific target, accuracy and consistency count. Additionally, a team can garner greater reward by heaving heavier gourds.

According to the motto: "Those who do the work do the learning," it becomes clear the work put in by these teams precipitated a considerable amount of education. Talk to your teacher about assembling a team and heading to OSU to participate next fall!

The past two years Sam Barlow has created spring-propelled devices that have worked reasonably well, but the engineering was impressively educational and considerably enjoyable. Further, the first year the Barlow team entered a device, the team made adjustments to

The work put in by students to engineer (design, build, test, modify, test again, and again) and finally compete is a valuable and educationally sound endeavor.

the design, retested, and entered the device into a local science fair where they earned top honors for the engineering category.

Centennial High School won the 2011 event, shooting a pumpkin 50 yards and nearly hitting the target – only a few inches away several times. Nestucca High School placed second, in a close competition, and Barlow rounded out the top three.

Nestucca High School won the 2012 event with a considerable trebuchet device, employing several hundred pounds of counter weight to hurl sizable pumpkins 50 yards or more. They were consistent, had a grand device, and all the paperwork and relevant testing data, giving them the first place award. The second and third place awards were taken by the ACE teams, which employed slingshot devices and were consistent in hitting the target.

If you are looking to win the event, keep in mind this is ultimately an engineering competition and success alone will not advance you into the top spot. A nice portfolio with hand drawings, AutoCAD or other CAD drawings, pictures of the fabrication, evidence of problem solving, testing data, and improvements to the

Here is last year's official posting of the contest rules and regulations by OSU:

Rules:

- Entrance Fee is $5 per team; with team no more than 4 people. The event is open to all OSU students and participating high schools.
- Schools can have multiple teams.
- Size of device must be no larger than 6x6x6'. The device is allowed to exceed dimensions during operation.
- Competitors must supply their own pumpkins. There are no size or shape restrictions; however it must be an orange pumpkin to qualify.
- Larger, heavier pumpkins will be awarded additional points.
- Competitors will have 5 consecutive shots.
- Devices employing the use of hydraulics, pneumatic, explosives or engines are banned.

Scoring:

The device shall be judged on design, performance, and safety. The device shall be designed to impact a target 35 yards away.

Design:

- Relevant documentation of design of the device (+10pts)
- 2 pts- Design explanation
- 2 pts- Clean, relevant physics
- 2 pts- Testing data
- 2 pts- Device Image, labeled
- 2 pts- Team/Member Names, use of clean presentation
- Team Spirit (+15 pts), themed teams (+5).
- Well-made (+10 pts).
- Aesthetically Pleasing (+5 pts).
- Functional (+5 if successful/ -5 if non-successful).

Performance:

- 35 yard target (+50 pts).
- 5' rings around target (+30, 15, 5 pts).

Safety:

- Deemed safe (+15pts), competitors have until 2:30 p.m. to make repairs to device.
- If deemed unsafe competitors have until 2:30 p.m. to make repairs to device to qualify for performance.
- If deemed unsafe during competition judges may remove device from competition and judged solely on design.

Prizes:

- First Place: Cash prize and team picture will be placed in ASME display case.
- Best Design: gift card.
- Most spirited: gift card.
- Other prizes subject to judges' whims.

Judging:

Will include at least one Mechanical Engineering faculty member, at least one ASME officer, and at least one person affiliated with the art department for the aesthetics portion.

Still have questions? Contact ASME Chair Shaylynn Allen: alleshay@onid.orst.edu or Public Relations Chair for more information.

The teams that have done well in the past have done the following things:

1. Hit the target in the air.
2. Hit the target multiple times – accuracy and consistency.
3. Used a binder to organize:
    1. Design Process, including drawings – both rough and CAD.
    2. Testing data, including tables and charts.
    3. Build process, including photos.
    4. Define and delineate problems and solutions during the fabrication.
4. Team spirit (names, well painted, finished look)

The organizers of the event indicated there might be further changes to this model of competition, based on device. Slingshot-type devices may be judged separate from the mechanical type devices, offering a more narrow range of competition.

A portfolio with hand drawings, AutoCAD or other CAD drawings, pictures of the fabrication, evidence of problem solving, testing data, and improvements to the machine based on the data, all organized coherently are what will separate one team from another.

machine based on the data, all organized coherently are what will separate one team from another.

Teachers and students alike have enjoyed all aspects of this event, and the 2013 Pumpkin Chunkin' Event is sure to be fun. If you would like to participate, please work with your school, create a device, test it, and compete! The pictures included are from this past year's event. For more information please contact:

- Jay Etnier at Sam Barlow High School: etnier@gresham.k12.or.us
- ASME Chair Shaylynn Allen: alleshay@onid.orst.edu
- ASME Public Relations Chair for more information: https://sites.google.com/site/osuasmestudentsection/welcome-announcements/pumpkinchunkin2010

Jay Etnier is a Career and Technology Education instructor at Sam Barlow High School and the 2010 recipient of the Oregon Building Congress Vocational Educator of the Year award.

BY MIKE BRYANT

ACE Academy, industry partners team to offer variety of Capstone projects

Two years ago, the staff at ACE Academy set their sights on Phase Two: connecting current curriculum to postsecondary experiences. ACE Academy is an industry-powered machine, and our students needed "that final push." I like to say, we have given our students the opportunity to get out of bed early the day after graduation. "Whether it be a two- or four-year college experience or direct entry into a training center or into the job market, we wanted our students to be on their way."

With the support of our industry partners and training centers, we have ignited our mission. This year Ace Academy is proud to offer students 18 industry-led Senior Capstone projects. Each project is thoughtful, pre-planned and comes with a mentor. Each mentor is a trained industry professional, eager to work with students who are ready and willing to go that extra step for opportunity. The architecture field, this year, made great headway in providing multiple opportunities through Soderstrom Architects and SERA Architects. On the construction side, the Pacific Northwest Carpenters Institute (PNCI) hammered out curriculum and expectations for three Capstone projects mentored by their training staff. P & C Construction, Turner Construction, and Hoffman Construction facilitated a total of six Capstone projects in construction and engineering. Portland General Electric blew a fuse after meeting the two mentees that would work on projects in the engineering field. The city of Gresham challenged four of our students in the area of permitting, inspection, and facilitating state-funded programs.

An ACE Academy student works on his Capstone project with an industry mentor.

There has been a surprise in this journey — those kinds of surprises which often come from good-old collaborative teamwork. The surprise was a gift from our industry partners of summer jobs, training, and paid and non-paid internships. Our industry partners are responding to the struggles in public education by removing barriers within their own companies, which have in the past prevented our youth from exploring careers and preparing for the work force.

ACE Academy will strive to provide 50 Capstone options for our students which will include post-secondary experiences, through our work with the industry partners. We will cross our fingers that, over time, the exposure of students through their Capstones will enable them to learn what I like to call the extras.

Mike Bryant is director of the ACE Academy.

BY BRIDGET QUINN

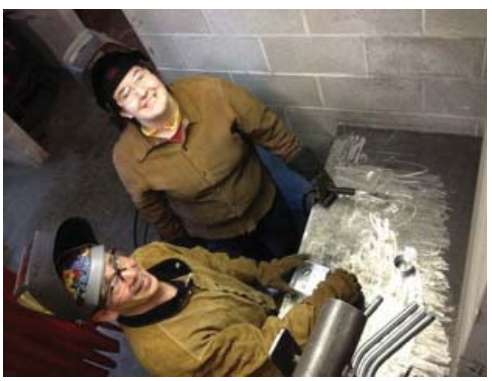
Sparking Education

NECA-IBEW Electrical Training Center promotes apprenticeship

It is a wonder that few high school students and their parents know about the opportunities that apprenticeship affords, with an 85 percent graduation rate compared to 30 percent of colleges, and a full scholarship for training that will land you in an exciting and rewarding career the day you begin your apprenticeship. The NECA-IBEW Electrical Training Center has set out to connect high school students as well as their teachers and counselors with the information that they may be lacking when decisions about post high school pathways emerge.

Apprenticeship is an ancient form of passing knowledge, attitude, and skills about a trade from one generation to the next. The NECA-IBEW Electrical Training Center is serious about workforce development, and ensuring that the tool belts that are left empty with upcoming retirements are filled once again with bright and motivated craftspeople. Hiring Journeyman Inside Electrician Bridget Quinn as a full-time Workforce Development Coordinator is one step forward to ensure that the National Electrical Contractors Association does not suffer a workforce shortage, and that the buildings and remodels of the future have the craftspeople to complete them.

Picture the traditional career fair day with a booth of info and a mass of disinterested teens. Now imagine a classroom of teens using basic electrician's hand tools to wire a circuit, which is then energized to show the satisfying fruits of their effort and skills. Grins, high-fives, and pictures of a glowing light bulb are quickly uploaded to their Facebook pages. A more hands-on approach, which allows them to try out the trade, has shown to be very effective at capturing a teenager's attention. More often than not, questions about how to apply for the apprenticeship suddenly emerge at a greater number than earlier in the workshop before the hands-on part started.



A hands-on approach, which allows students to try out the trade, has shown to be very effective at capturing a teenager's attention. Questions on how to apply for apprenticeship increase following the hands-on portion of a workshop.

There is no question that the tangible results of physical work are immensely satisfying; this is why a hands-on approach versus a lecture approach to outreach is so important. The NECA-IBEW Electrical Training Center offers that experience. ACE Academy and Reynolds Learning Academy send their construction students to the training center for a full week of classes ranging from electrical theory to circuit wiring, conduit bending, and welding. Annually the training center hosts and participates in Oregon Tradeswomen Inc.'s Women in Trades Career Fair, which is a cornucopia of workshops offered to middle school and high school girls so they can see what options are out there and try out different trades. The NECA-IBEW Electrical Training Center attends career fairs as well, but focuses mainly on those that allow for a workshop and time to connect students with the real picture of the electrical trade.

The NECA-IBEW Electrical Training Center is proud to build our workforce with talent, while connecting high school students with a career path that offers good wages, IBEW union support and pride, and some of the best retirement and health care packages out there.

Bridget Quinn is the Workforce Development Coordinator and journey worker electrician at the NECA-IBEW Electrical Training Center in Portland. You may contact her at 503-501-5069 or at bquinn@nietc.org.

BY MARY ANN NAYLOR PHOTOS BY DAWN JONES

Three days of education, inspiration, opportunity for the next generation of tradeswomen

Have you ever wondered what it might be like to work as an electrician, carpenter, heavy equipment operator, or in another trade? Have you ever wanted to feel the power of running a jackhammer? Perhaps you have wondered about your career options as part of the "green economy" and how to do your part in the fight against global warming.

Oregon Tradeswomen Inc. (OTI) started the Women in Trades Career Fair 21 years ago with the mission of creating an exciting, interactive event specifically for girls and women to explore non-traditional career options in a fun, safe, and positive setting. "Every year I am reminded about how important it is for girls to have the opportunity to try their hand at different activities and to talk with women role-models who are actively working in trades careers," said Connie Ashbrook, OTI's executive director and one of the four original tradeswomen who founded the non-profit organization. "It not only introduces young women to careers they may never have considered, but it helps them realize that these rewarding careers are truly a possibility for them, too."

Over the past 21 years, the Fair has grown from a one-day event into three full days of unique offerings to connect aspiring tradeswomen with opportunities for additional training, apprenticeship, entry level employment, and careers. Schools from all over Oregon and Southwest Washington take groups of girls to experience this incredible event – some schools travel for hours and bring groups of students every year!

Middle School Girls' Day

Thursday, May 16
(Schools must pre-register)

High School Girls' Day

Friday, May 17
(Schools must pre-register)

Careers For Women Day

Saturday, May 18
(Free and open to the public. No pre-registration required)

"The Fair is a labor of love for all the apprenticeship programs and employers who present the workshops, as they seek to reach out to the women and girls who attend," Ashbrook added. Indeed, it is the interactive, hands-on workshops that make the Fair such a fun, energetic, and educational event for the young women who attend.

To give a clearer picture of the variety of activities offered at the Fair, there will be nearly 40 different workshops offered in 2013, including running a jackhammer, operating heavy equipment, welding, soldering copper, climbing a utility pole, wiring a light and switch, riding up in a 187-foot bucket truck, climbing a 110-foot fire ladder, building projects to take home such as bird feeders, step stools, picture frames, chalk boards, tool boxes, and concrete stepping stones, plus opportunities

to learn about environmentally friendly eco-roofs, solar and wind power, automobile mechanics, and so much more!

Exhibit Booths

As a strong complement to the many diverse workshop offerings at the Fair, are the dozens of companies, community colleges, government agencies, apprenticeship training centers, and other organizations who exhibit at the Fair on Friday and Saturday to reach out and connect with women interested in learning more about the industry and pursuing a career.

In fact, there are more than 70 exhibitors at the Fair each year, offering an extraordinary opportunity for high school seniors to discover a variety of career options available in the trades after they graduate. The representatives at the exhibit tables are excited to talk about how to get started in their industry and offer a lot of helpful information at their booths for people to take with them. One job seeker at the 2012 Women in Trades Career Fair told us, "Thank you for an awesome day! I liked that you showed me I can have a new career without having to go to college!"

Work-Wear Fashion Show

One of the most popular activities at the Fair is the work-wear fashion show – a fashion show for tradeswomen! One by one, tradeswomen come out on the runway wearing their tool belts, the clothes they typically wear on the job, and carrying any specialty tools specific to their trade. The tradeswomen – whether they are line workers, plumbers, carpenters or sheet metal workers – talk about the tools and gear they use in their trade and what a typical day on the job is like for them.

There are a lot of surprised faces in the audience after the tradeswomen explain their apprenticeship process and talk about how much money they made when they first started out as an apprentice — and how much they expect to earn when they turn out as a journey level worker. Most of the young women are excited and very interested to learn that trades careers start at $12 to $15 per hour and with wage increases, these jobs can earn up to $20 to $35 per hour – or even more, PLUS benefits!

Careers for Women Day

While the first two days of the fair are reserved for school age girls, the third day of the Fair is open to the public, and free! There are dozens of workshops on Saturday – some are drop in and others are offered at specific times throughout the day. If you aren't able to be at the Fair with your school on Thursday or Friday, or if you want to come back and participate in more activities, you are invited to come with friends and family on Saturday, May 18 – Careers for Women Day! Exhibitors are there on Saturday, too, making Careers for Women Day a valuable resource for women seeking a new career or high school graduates and seniors looking at options for their futures.

OTI makes it as easy as possible for you to attend the Fair on Saturday, too. There is FREE transportation on EcoShuttle starting from the Gateway Transit Center to the Fair and back starting at 8:45 a.m. on Saturday, May 18, and returning to Gateway every hour. (Please visit www.tradeswomen.net/fair for the full schedule). Attendance and parking are free, and there is even free, onsite childcare. Everyone is welcome!

Dads & Daughters Workshop

The Dads and Daughters workshop happens at 1 p.m. on Saturday, May 18. This unique, hands-on workshop is a distinct part of the Women in Trades Career Fair and is offered to engage active trades workers in encouraging their daughters' explorations of satisfying, living-wage careers in the building, construction, mechanical utility, and highway trades through hands-on trades-related activities. There will be small prizes to the first 20 young women in attendance with their Dad or other important adult in her life, too.

Photo Booth

Portland Youth Build Media created this photo booth opportunity for the first time in 2012 and it was wildly successful, with hundreds of people donning construction work wear, holding tools, and having photos of themselves taken and superimposed onto photos of construction worksites! We will have the photo booth at the Fair again this year and hope you will participate in the fun on Saturday, May 18!

Pre-Apprenticeship Program

When you're at the Fair, we want to invite you to stop and talk with us! One of the most active exhibit booths at the Fair is OTI's information table where we offer information about our state-certified Trades and Apprenticeship Career Class - a FREE pre-apprenticeship program for women only to help them explore, prepare for, and find successful and rewarding careers in the building, construction, mechanical, highway, and utility trades. The seven-week class includes classroom learning, hands-on experience, trades math and measurement, visits to apprenticeship training centers, and even strength training with a fitness trainer. After graduation, OTI's career counselors will help you enter into a formal apprenticeship program or find entry-level work.

Summer Camps, Work Crew

You can also learn about OTI's Building Girls Summer Camps for high school and middle school girls, offered this year in July for only $25 per week. During camp, girls learn to weld, tile, frame, use saws and much more, while having fun with friends! We will also have information about paid, on-the-job training offered once a year by OTI for 17- to 24-year-old girls, called the Building Girls Work Crew.

If you are interested in learning more about any of these programs, or interested in exploring trades career options, please come visit us on Saturday, May 18, at the 21st Annual Women in Trades Career Fair. The Fair is graciously hosted by NECA-IBEW Electrical Training Center located at 16021 N.E. Airport Way, Portland OR, 97230. For a full list of all the activities on Saturday, please visit OTI's Web site at www.tradeswomen.net/fair.

We hope to see you at the Fair!

Mary Ann Naylor is public relations specialist with Oregon Tradeswomen Inc. For more information, call 503-335-8200 ext. 21, email info@tradeswomen.net or go to www.tradeswomen.net/fair. OTI also is on Facebook: www.facebook.com/OregonTradeswomenInc