APPLICATION COVER PAGE
(Please Print or Type – All Fields Must Be Completed)

Project Name: Philomath High School's Manufacturing Technology Enhancement
Amount Requested: $253,467

Project Director: Scott Ballard		
District, School or ESD: Philomath High School		
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District, Charter School or ESD: Philomath School District		
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Superintendent: Dan Forbess		
District or ESD: Philomath School District		
Address: 535 South 19th Street		
City: Philomath	State: OR	Zip: 97370
Phone: 541-929-3169	Email: dan.forbess@philomath.k12.or.us	

	Participating High School or Middle School Name (add additional rows as needed)	Lead Contact Name	Grade Levels	Student Enrollment
1.	Philomath High School	Ken Ball, Principal	9-12	530
2.	Philomath Middle School	Steve Bell, Principal	6-8	314

Please check all that apply:

_X__ This project directly involves Career and Technical Student Organizations

Please note page of proposal that describes this relationship. Page: ___37_____

_X__ This project has a clear connection to STEM

Please note page of proposal that describes this relationship. Page: ____38_____

Business, Industry, Labor and Postsecondary Education Partners

The following individuals and/or organizations have reviewed, discussed, and agreed to their part in implementing the project proposed in this grant application:

(**See Appendix A for Partner Letters of Commitment**)

	Name	Title	Organization
1.	Ed Landis	Vice President of Production	CTC (Corvallis Tool Company) 3178 West Hills Rd. Philomath, OR 97370
2.	Mike Nelson	Owner	West Coast Machine Inc. PO Box 33 Blodgett, OR 97326
3.	Andrew L. Evans	Owner Operator	Evans Precision Tooling Inc. PO Box 1090 Philomath, OR 97370-1090
4.	Spud Miller	Owner	Fuel Injection Enterprises, LLC 1710 Independence Hwy NW Albany, OR 97321
5.	Fred Stuewe Dean Dowless Dave Ketler Steve Middleton	Dept. Co-Chair Dept. Co-Chair Welding Faculty Machine tool instructor	Linn Benton Community College Welding Technology Program 6500 Pacific Blvd SW Albany, OR 97321
6.	Bobby Van Cleave	Plant Manager	BowTech 90554 Hwy 99 N Eugene, OR 97402
7.	Andrew Hill	President	Northwest Technical Products Inc. 4928 SW Lake Flora Rd. Port Orchard, WA 98367
8.	Mike Goodrich	Vice President	Legend Homes Corp. 12755 SW 69th Ave. Suite 100 Portland, OR 97223

Purpose and Scope

The Philomath High School Manufacturing Technology program is applying for grant funding through the Oregon Department of Education to enhance educational opportunities for students. We are hopeful our program enhancement efforts will lead to increased student opportunity in CTE classes and consequently, a greater number of students leaving with a greater set of employability skills – both technical and work readiness.

Primarily, we intend to enhance our current Manufacturing program by adding a CAD/CAM component that will include MasterCAM, 3-Axis CNC Vertical Milling machines, a CNC Lathe, a CNC Plasma CAM, a color printer, and a plotter. Additionally, we will add a construction curriculum to our CTE offerings. Students will be required to complete construction coursework as a pre-requisite to job shadows and internships with local business partners. Local contractors will provide training and potential future employment opportunities for students who complete the program. We will continue to develop integrated academics curriculum where students apply math, science, technical writing, and business skills. We will develop a project-based curriculum where students produce marketable products in collaboration with our PHS Marketing Program.

Our efforts will include enhancing our partnerships with business, industry, and other educational providers to better align our program with industry-recognized technical standards, relevant academic standards, and employability skills preparing students for high wage, high demand technical careers or post-secondary technical

education. Consequently business and industry partners will be provided with quality skilled workers for the benefit of our local community.

Innovation. Philomath High School is prepared to use this potential funding as an opportunity to teach outside the box, allowing the leaders in this endeavor—teachers, administrators, business partners—to work across conventional boundaries that, more often than not, tend to constrict the methods a teacher would otherwise be able to use, and thus diminishing our students' potential for authentic learning. This grant will be the catalyst in taking student learning and performance to new levels.

The cornerstone of our innovation centers on a unique relationship between PHS Manufacturing Program and our local industry partners. This partnership allows teachers and students direct access to professionals and tradesman from industry within our community. This results in direct instruction from industry experts, professional development for teachers, and student opportunities including direct instruction, job shadows, and internships. Lastly, our model minimizes a student's learning curve in transitioning from the tech shop to the workplace, thus preparing the students for the workplace while also benefiting our industry partners.

Students who produce work that is sold to members of the community are motivated by their ability to market their skills - they pay more attention to the details, and customer satisfaction becomes real. This situation produces a high impact learning opportunity. We feel that when students produce marketable products a real world connection is made. Students will also re-use and re-purpose historic materials gained from the demolition of the old building, and in the process learn valuable lessons about

conservation of resources. Aside from the quality of learning, this method also generates funds that help sustain and improve our manufacturing program as a whole.

Integration. Quality instructional strategies are engaging and lead to enhanced student motivation. Using a "rigor, relevance, and relationship" approach, student learning is enhanced when contextual learning is the framework for instruction. Our "thematic units" approach, integrating reading, writing, math, science, manufacturing, and marketing curriculum, will engage students in their own learning because they will be able to apply this content in real-world problem solving learning environments. Students will be assessed using proficiency rubrics, based on what they will "know, value, and do," as determined and developed by our team of PHS instructors.

We will be adding and restructuring courses to include CAD/CAM/CNC curriculum because we know, along with our business and post-secondary education partners, that emerging technology and global markets are ever-changing. We will work with our partners to continually develop and refine the elements of our program to meet the present and future demands of a highly-skilled, high wage workforce.

Expansion and Growth. Machining and CAD/CAM software applications are essential to modern day manufacturing practices. Currently at PHS, we offer almost nothing with regards to this discipline. The addition of the equipment, training, and curriculum development that will result from the CTE Grant will revitalize and modernize our Manufacturing Program. Students will be afforded opportunities that prior to now have been non-existent. Along with the forming of our business partnerships, the acquisition of the CAD/CAM equipment and subsequent training and curriculum is certainly the

cornerstone of our motivation towards pursuit of the grant funds. In other words, it will take PHS Manufacturing to another level, it means a lot for the future direction of our program, and most importantly, it will provide an entire new set of opportunities for our students.

By receiving these funds we will be preparing students to enter the workforce by providing them with essential skills that align with the Oregon Skill Sets. This prepares students to move into entry level jobs in the technical field, and also prepares them for post-secondary education and trade schools. This translates to a higher degree of job readiness for PHS graduates in the Manufacturing workplace.

Experiential Learning. The process of organizing our ideas and gaining direction by applying for the CTE grant fund in 2012 has led our program in positive directions. Since then we have established strong connections with local industry and created partnerships that have opened new doors for students at Philomath High School (see Appendix B).

Jacob Carlson, class of 2013, learned to run a CNC vertical mill, surface grinder, EDM (Electronic Discharge Machine), and other equipment manufacturing high performance parts with Evans Machine. Riley Watkins, class of 2012, and Will Scott, currently a senior at PHS, both interned at Corvallis Tool Company (CTC) in their welding and fabrication shop. Kenny McGarry, class of 2012, was given the opportunity to apprentice for Mallory Ignition and is now building components and assembling parts for high performance magnetos.

These are just a few of dozens of Philomath students whose cooperative work experiences have paved the way for strong connections with local industry. These stories have motivated our program towards further growth in this area. It is now our desire to build off of the foundation we've created.

Project Description

A. Project Outcomes and Progress Markers

Partners in Business and Industry. During his 19 years at Philomath High School, Scott Ballard has developed strong partnerships with local business and industry. In addition, our CTE Welding and Drafting program articulations with Linn Benton Community College have thrived because of Scott's relationship with LBCC welding and machine technology instructors, Fred Stuewe, Dean Dowless, Dave Ketler, and Steve Middleton. Overall, our CTE programs at PHS are enhanced due to mentorships fostered with LBCC instructional staff. Over recent years, Philomath students have benefited significantly when considering the number of articulated credits earned during high school that apply toward a college degree.

Our business partners were consistent in expressing a need for PHS students to have basic machining and computer aided manufacturing skills that would complement their welding, fabrication, and basic computer aided drafting skills. In addition, our partners asked that we stress good communication skills, problem solving skills, and related workplace readiness skills. Our business advisory committee members offered to provide PHS students with work experience placements. Lastly, private business advisory committee members will help support our project with in-kind, on-site technical

expertise, valued at $20,000, to help mentor PHS teachers and students and estimate providing $5,000 of donated materials and supplies to our program budget.

Partners in Education. As previously mentioned, PHS and LBCC have established strong program articulation agreements. LBCC instructors have committed to continuing their instructional mentorship and on-site classroom visits that will accelerate our efforts to expand our manufacturing program curriculum. The LBCC *College Now* program includes the opportunity for PHS students to enroll in LBCC courses under the *"Expanded Options Program"* and earn associate degree credits beyond high school offerings.

Our lead manufacturing instructor, Scott Ballard, is an accomplished welder and fabricator. He is able to engage students in his classroom because he skillfully blends real-world experiences with prolific teaching skills. He has a strong background in metallurgy, is a competent user of AutoCAD, and will need professional development in the areas of intermediate Computer Aided Design (CAD), Computer Aided Manufacturing (CAM), and Computer Numerical Control (CNC). CAD/CAM/CNC training will begin with one-on-one instruction from two primary trainers: Steve Middleton and Andrew Hill.

Steve Middleton is a former high school CTE instructor, part-time LBCC instructor, and private business owner. Steve's CTE manufacturing program was eliminated several years ago because limited district resources were shifted away from CTE courses to afford remedial language arts and math courses. Steve will be hired by Philomath School District to train and mentor our staff in developing thematic integrated

academics curriculum units. He will also provide professional development instruction to Scott Ballard in the area of machine tool technology and computer numeric control.

Andrew Hill is president of Northwest Technical. His company is the premiere supplier of machine products and equipment provider of professional development workshops in our region. He will be providing software, hardware, equipment and professional development in the use of the new CAD/CAM machining software and tooling.

In addition, Philomath School District Superintendent, Dan Forbess, a licensed Industrial Technology instructor, will provide Scott Ballard with initial intermediate AutoCAD training and play an on-site, supporting role in his CAD/CAM/CNC professional development.

Improved Student Access. Based on both 2012-13, and current manufacturing technology student enrollment data, we anticipate 40 entry level CAD/CAM/CNC students and 20-plus students completing a yearlong advanced CAD/CAM/CNC program. In an effort to accommodate these advanced classes and otherwise rigorous class schedules, Philomath High School has created a flexible afternoon schedule for the entire spring trimester. This schedule allows students to come and go to classes as well as participating in job shadows and internships with our local industry partners.

Technical and Academic Rigor. The manufacturing sector is growing. However, according to our business advisory committee and reported national trends, students in our Manufacturing Technology program are missing an important instructional component; computer aided manufacturing with related numerical control machining instruction. Although we have a basic computer aided drafting component,

we know our students need to learn the process of machine/manufacturing design, coordinate geometry exchange, ability to create and understand numerically controlled equipment, and CAD/CAM systems for use with CNC milling machines, CNC machine lathes, CNC plasma cutting and 3D print model building.

Technical writing, applied math and physics, and public speaking content will be embedded in the enhanced Manufacturing Technology program. Scott Ballard has completed a “Math in CTE” program curriculum and addressed “Applied Academics” as part of his Master’s Degree work. In addition, entrepreneurial skills will taught in parallel with technical and academic pedagogy by incorporating the principles learned in our Marketing program. English teacher Janine Luta, science teacher India Sloat, math teacher Joe Dealy, and Marketing program teacher Nicole Stueve are partnering in our Manufacturing Technology program expansion in an effort to facilitate an integrated programs approach. Thematic instructional units will be developed by these four teachers with Scott Ballard so students can see the connections between their technical manufacturing course content and supporting academic programs. Steve Middleton will plan and facilitate PHS teachers during this critical curriculum development process.

Timeline of Measurable Outcomes and Markers.

1. By September, 2014, initial professional development on the use of computer aided manufacturing software (MasterCAM) along with operation of CNC vertical milling, CNC machine lathe, and Plamsa CAM equipment will be completed as measured by staff operating the equipment at entry level proficiency.
2. By January, 2015, additional professional development on the use of computer aided manufacturing software (MasterCAM) along with CNC vertical milling, CNC

machine lathe, and Plasma CAM will be completed as measured by staff operating the equipment at a basic proficiency level.

3. By January, 2015, our Manufacturing Technology program will have developed curriculum based upon the Oregon Skill Sets, specifically aligned with the Industrial and Engineering Systems Career Area, Manufacturing Cluster and focused in the area of Mechanical CAD/Drafting. Coursework will include some or all of the specific skill sets identified in section MNPJ10.5 “Detail projection views/components.” The design curriculum will teach students the CAD/CAM software including AutoCAD, MasterCAM, and Cubit, thus preparing students to move into the CNC milling, turning and 3D plotter/printer applications.

4. By January, 2015, our Manufacturing Technology program will have developed curriculum based upon the Oregon Skill Sets, specifically aligned with the Industrial and Engineering Systems Career Area, Manufacturing Cluster and focused in the area of Machining and Metal Forming. The curriculum will include skills specified in sections MNPH10.01- MNPH10.10 and include safety protocols, lock-out and tag-out procedures, materials identification and selection, use and application of measurement and precision measurement tools such as calipers, micrometers, and scales. And finally, the ultimate Skill Sets we are after is that students will “perform metal cutting operations on a lathe” and “perform metal cutting operations on a mill”, as specified in sections MNPH10.05 and MNPH10.06.

5. By March, 2015, math, science, language arts, and career & technical instructors will receive professional development on how to integrate core academics curricula with career & technical Manufacturing and Marketing program curricula in a manner that

provides students with the opportunity to “apply” academic subjects in the Manufacturing and Marketing course areas as measured by at least one instructional unit developed in each of the core academic areas of mathematics, science, and technical writing.

6. By June, 2015, program course work development at PHS will be articulated with LBCC associate degree program credits as measured by written agreement and the number of students receiving LBCC credits. In the 2012-2103 school year more than 60 students qualified for College Now credits from LBCC through the drafting and welding classes at Philomath High School. Our goal is that 25% - approximately 5-7 students - will be proficient and ready to receive LBCC College Now credits.

7. By June, 2014, the number of students participating in job shadow and cooperative work experience placements in the CAD/CAM CNC industry will be 25% of the 15-25 projected students in the machining classes.

8. By June 2015, the number of non-traditional program completers will show an increase of 10% as measured by the total increase compared to the 2012 -13 school year (the number is unknown, but is projected to be less than 5 students).

9. By June 2015 our goal is add 2 or more building and construction partners to compliment current partner Mike Goodrich of Legend Homes. In addition, 5 or more students will complete the Building and Construction curriculum AND complete job shadow(s) or internships with one of our industry partners.

B. Career and Technical Education Program of Study Design

As noted previously, our primary effort is to add a strong CAD/CAM/CNC design and machine technology element to our existing Manufacturing Technology program and to incorporate a new construction component. In addition, an applied academics aspect will be an essential component of our enhanced manufacturing curriculum. Highly qualified science, math, and English teachers will team with our CTE teachers to develop "thematic units" aimed at integrating core academics with hands-on technology applications. An entrepreneurial component will involve our Marketing program instructor, Nicole Stueve. Students will not only learn to design and build, but also to then market the products they create.

As students learn to operate CAD/CAM/CNC software and hardware, complementary core academic curriculum – applied math, science, and communications - will be integrated within key thematic units that will be developed by Philomath High School staff. The multiple assessments will be part of a "credit by proficiency" scoring guide that each teacher will utilize to track student proficiency in manufacturing, math, science, and English.

Industry and Academic Standards. The essential academic skills required for an Oregon Diploma – reading, writing, math, and science – will be embedded with every thematic unit developed as part of our enhanced CTE manufacturing program project. Incorporation of the *"Oregon Skill Sets,"* required for CTE program approval, will be essential to the success of our manufacturing technology program enhancement efforts. Newly developed instructional curriculum elements will be reviewed with our advisory committee members to confirm the use of standards development in these areas: Metal forming, Machining, Machine Building, Machine Maintenance, Stamping, Screw

Machining, Press Brakes, Mold Making, Punch Press, Slide Forming, Laser Cutting, Die Making, and Casting.

Our advisory committee members agree with the assessment made by the Oregon Workforce Investment Board (OWIB) Manufacturing Workforce Committee (March, 2010), that "manufacturing matters" and the rapid changing skill requirements in the manufacturing industry require that schools and colleges address the dynamic need for preparing and training students and workers. As evidenced by the strong support for our CTE Manufacturing Program (see Appendix A), our business advisory committee will be actively involved as partners in our efforts. Partnerships have been established and nurtured through direct student involvement with experts in the classroom, and we've learned that both parties have mutual interests that benefit each other.

Post-Secondary Technical and Academic Preparation. Philomath High School and Linn-Benton Community College have been active partners in preparing high school students for post-secondary learning opportunities. In 2012-13, there were 154 students who earned one or more credits in a Manufacturing Technology class. More than 50 of those students earned college credit at LBCC through our College Now articulation program. As noted in our letter of support from LBCC staff (see Appendix A), our project will enhance the number of manufacturing technology credits awarded to PHS manufacturing students through LBCC.

Additionally, in a separate Mid-Willamette Valley Partnership (MVP) consortium led by Oregon State University, Philomath School District is partnering with Corvallis, Albany, and Lebanon School Districts, along with Linn-Benton-Lincoln ESD, LBCC, and Oregon State University in a regional effort to improve teacher preparation and

continuing professional development for mathematics teachers. The effort is designed to increase the academic preparation of elementary, middle, and high school students through improved curriculum development and teaching practices. The PHS Manufacturing Technology Enhancement project will integrate thematic curriculum development work in concert with the MVP consortium grant efforts.

High Demand Careers with High Wage Potential. The global economy is returning manufacturing jobs to America because the low wage advantage enjoyed by many Asian countries during the past four decades has been lost. In short, a common wage structure for highly skilled manufacturing workers is equalizing to the global economy. More than 162,400 manufacturing jobs were driving the Oregon economy during 2010. These "*High Skill-High Wage"* jobs are expanding in Oregon and according to the 2010 OWIB report, "Manufacturing has good jobs!" Our business and post secondary education partners recognized the need to ramp-up our collective education and job training partnerships, which is why we are excited about the opportunity provided to our district through the CTE Revitalization Grant – we are ready, willing, and able to answer the call that will lead to highly skilled manufacturing workers for increasingly higher wage jobs in Oregon.

C. Underserved Students. Economic downturn and declining enrollment has changed the face of our building. With fewer students to serve, our district has absorbed a bombardment of cuts. The high school has lost a third of its teaching staff since the early 2000's, programs have dissolved and thus, students have suffered from a decrease in opportunities. As our nation rebounds, openness to new opportunities for

young people grows and currently, CTE classes are becoming more attractive to a variety of students. Our approach is to build from within, and the CTE Revitalization Grant is an opportunity that can help jumpstart a portion of the growth our students need.

With facilities, tools, and technical upgrades as well as opening up the doors of opportunity for skill building, apprenticeships with local partners and potential job placement, an increase in attraction and interest to both our school, and specifically our Manufacturing Technology program, follows. This creates incentive for parents to choose to send their kids to Philomath High School and motivation for students to share that interest. We feel that the enhancements to our programs outlined in this proposal will increase our ability to serve a wider range of students including English language learners and ethnic minorities, non-traditional occupations for gender, students with disabilities, students from lower socioeconomic groups, and first generation college-going, by providing them with a greater range of options.

Our current nontraditional CTE participation rate has been averaging 43% for the past several years. Our target goal of 45% was not reached. We plan to ramp-up our efforts to recruit underrepresented gender groups. We believe the CAD/CAM/CNC design and manufacturing curriculum will attract female students, currently averaging less than 20%, to the Manufacturing Technology and Construction field because we have already attracted underrepresented students to our drafting courses – our goal is to double the percentage of female students in this program. The CAD/CAM/CNC curriculum will be advertised as a gateway to careers in engineering and manufacturing related careers that require math, science, and problem solving skills. Scott Ballard and

Ken Ball will work with Philomath High School counselors, Beth Edgemon and Kim St. Clair, as well as Philomath Middle School counselor, Mike Panico, to advertise the elements of our CAD/CAM/CNC curriculum to female students and actively recruit them into the program. We feel that growth will continue by highlighting access to highly technical modern equipment, apprenticeship opportunities with local industry, and potential job placement.

D. Diploma Connections. Currently, the state of Oregon requires students to earn 3 credits in Career and Technical education in combination with a second language and the arts. Incentive to take CTE classes to fill this requirement increases because CTE classes offer a direct link in attaining other grad requirements. Oregon's Career Related Learning Standards (CRLS) are directly covered in Scott Ballard's manufacturing classes. The Career and Service Experience (CASE, formerly known as the Senior Project), a graduation requirement, can be completed through taking these courses as well.

Student Support. Scott Ballard teamed up with math teacher Joe Dealy to complete the Math-In-CTE training throughout the 2008-09 school year and are now certified. They have since embedded Math benchmarks from the Common Core Curriculum combined with Mathematics skills detailed in the Oregon Skill Sets section MNZO1.01, which specify making calculations to calibrate equipment, use of percentages, cost analysis of part production, geometry and application, and interpretation of blueprints. Furthermore, also embedded within the manufacturing curriculum will be the understanding and application of the principles of science used in manufacturing as stated in section MNZO1.02 of the Oregon Skill Sets. Specifically,

students will be able to identify dangerous chemicals, read and understand MSD (Material Safety Data) sheets, and understand mechanical principles of machinery and related safety protocols. Direct student-teacher contact time has been incorporated into our daily “advisory/study hall” time in order to provide support for these curricular enhancements.

***Essential Skills*.** As students are developing essential skills in language arts, math, and science, they will also be meeting career-related learning experiences due to the commitment of our business and post-secondary partners. As indicated in their letters of support (see Appendix A), our partners will be utilized in providing skill training, job shadow, cooperative work experience, on-the-job training, and other personal career related learning experiences that will enhance essential skill development..

***Personal Education Plan*.** Students at Philomath High School are assessed as part of their CTE exit outcomes via our Senior Project graduation expectation. Communication/English Language Arts standards are demonstrated through speaking and writing proficiency outcomes and must be passed in order to meet the graduation requirements of Philomath High School. In addition, personalized learning including career-related learning experiences that highlight and support the Essential Skills are monitored, reviewed, and evaluated by our staff at Philomath High School as well as by mentors working directly with their senior projects. Also included in the senior project is the participation of the student in opportunities that connect classroom learning with real life experiences in the workplace, community, and/or school which are relevant to the student’s education plan.

E. Sustainability and Communication. Philomath School District has a track record of sustaining important community-valued education programs and our community values hands-on learning opportunities. Half of our students are recognized as CTE concentrators and 83% of our students are enrolled in at least one CTE course. The CTE programs are growing. Enhancements outlined in this grant application and the markers used to measure our progress, in conjunction with recent Oregon education legislation (HB 2220) to require proficiency based assessment, will allow for students to receive credits in new ways. Local business partner, Hewlett Packard has been a consistent source of support for our technological needs including this year's donation of 20 new computer work stations for our CAD lab. We feel these factors will help sustain the growth sought in the CTE sector in our building.

An attractive and professional shop website is currently under construction. This site will be student created with teacher oversight. With new, user-friendly site creation tools, students can create a quality website and marketing tool. Students can fulfill graduation requirements, such as the CASE (Career and Services Experience) project (formerly our Senior Project), as well as gain valuable experience in site design, creating a site that's both practical and efficient, and marketing the shop and what it has to offer. A multi-media approach will be used in order to attract a diverse range of students to the program including uploading videos onto YouTube, and some promotion through social media, such as Facebook and Google Plus, which will highlight CTE projects as well as to highlight and celebrate actions, initiatives, and leadership throughout the year. Site data analysis will be gained – through Google Analytics and Facebook data – evaluated, and used to market the program and attract students.

Part of our commitment to communicating and sustaining our project will center on this student built website. It will act as a portal to the classroom providing the audience with a look behind the curtain to see the students, resources and equipment, and the projects they create. This site will be directly linked to the district page where those interested will be able to have direct access. Our new and improved district web site will be used to maintain up-to-date announcements about our project and we will feature student work on the district site as well.

Beyond the scope of the grant timeline, we will be collecting data to show that 40% of Manufacturing Technology concentrators will be transitioned into post-secondary training and/or entry-level employment after graduating PHS by June of 2016 as measured by follow-up survey data.

F. Activities and Timeline. Philomath High School Manufacturing Technology Enhancement Project

Activity	Outcome	Responsible	Timeline
1) CAD/CAM/CNC Training AutoCAD, MasterCAM, Techno programs	Scott Ballard initially trained at entry level	Steve Middleton, Andrew Hill/NW Technical, Dan Forbess, NW Technical	June-Sept 2014
2) Thematic Units Development	Manufacturing-based thematic units are developed, credits by proficiency defined	Steve Middleton, Scott Ballard, Ken Ball, Joe Dealy, Nicole Stueve,	March-Sept 2014
3) CAD/CAM/CNC Training Continues	Scott Ballard continues training at basic level	Steve Middleton, NW Technical	January 2015

4) Manufacturing Tech. Curriculum Program begins use of CNC/CAM equipment	Students begin using CAD/CAM/CNC equip at entry level	Scott Ballard, Steve Middleton, NW Technical	January 2015
5) Business Partners expand Job shadow & CWE options	All PHS Man. Tech students in workplace	**Scott Ballard, Adv. Committee**	June 2015
6) Students earn credits toward their diploma	Students awarded first CAD/CAM/CNC course credits with proficiency-based lan. arts, math, science, & marketing component for grad credit	**Ken Ball**	June 2015
7) PHS CAD/CAM/CNC program articulated with LBCC College Now	Students earn AA degree credits	Scott Ballard, Steve Middleton	June 2016
8) PHS Construction & Building Trades Curriculum implemented	Students Prepared for job shadows and internships with local industry partners	Scott Ballard, Mike Goodrich	September 2014

G. Evaluation. The manufacturing technology program project outcomes will be evaluated using qualitative and quantitative means, utilizing both professionals from our team of business partners and other third party evaluations such as the LBCC skills competition, and the standardized online CTE assessment tools. In addition, participating student academic success, CTE concentrators, will be measured using existing quantitative measures that will include: a) attendance, b) behavior, c) grade point average, and d) summative Oregon Assessment of Academic Skills test score growth. Lastly, we will utilize the evaluation goals and continue to monitor our Senior CTE Concentrator Performance Indicators, which include: 1) reading/language arts, 2) writing, 3) mathematics, 4) technical skill attainment, 5) high school completion, 6) high

school graduation, 7) secondary placement, 8) nontraditional participation, and 9) nontraditional completion.

Established Academic Related Goals – based on 2012-13 assessment data:

a. By June, 2015, the percentage of PHS CTE Manufacturing students meeting/exceeding the OAKS Reading/Literature essential skills benchmark will increase from 82.7% to 90% as measured by their 2015 OAKS assessment scores.
b. By June, 2015, the percentage of PHS CTE Manufacturing students meeting/exceeding the OAKS Math essential skills benchmark will increase from 75.9% to 82% as measured by their 2015 OAKS assessment scores.
c. By June, 2015, the percentage of PHS CTE Manufacturing students meeting/exceeding the OAKS Writing essential skills benchmark will increase from 56.3% to 70% as measured by their 2015 OAKS assessment scores.
d. By June, 2015, the percentage of PHS CTE Manufacturing students meeting/exceeding the Science essential skills benchmark will increase from 69.5% to 75% as measured by summative scientific inquiry assessments
e. By June, 2015, the percentage of PHS CTE Manufacturing students graduating from high school in four years will increase from 79.5% to 83% as measured by the PHS 4-year cohort graduation rate.

The following specifically addresses each of the project outcomes in the order they were outlined in Section A:

1. Our staff (Scott Ballard, Terry Heath) will be provided ample time and compensation to ensure they are trained and ready to operate the newly acquired CNC lathe, vertical mill, and plasma CAM by the start of the 2014 school year. Grant funding will provide instruction and curriculum development by Steve Middleton of LBCC and Andrew Hill of NW Technical and they will be charged with ensuring the staff is ready to operate equipment at an entry level and provide entry level instruction to students.

2. By the end of Trimester 2, 2015, industry professional Andy Evans will evaluate the staff's ability to operate manufacturing software and equipment at a basic level of proficiency based on industry standards and his years of machining experience. This evaluation will provide an objective assessment of how the PHS manufacturing and machining program is aligning with industry expectations and provide feedback and recommendations for how to improve any shortcomings.

3. By June 2015, 50% of the CAD/CAM & CNC machining program students will demonstrate a base level of proficiency in the Oregon Skill Set, identified in section MNPJ10.05.05.06 "Detail projection views/components." Students will "construct, sketch, and/or draw views of given objects showing visible and hidden features." Furthermore, students will (MNPJ10.06) "Explore mechanical drafting/design concepts and problems." This will include demonstrating a proficiency in the use of manufacturing and machining terminology, use of mechanical design symbols, and preparing a working drawing for CNC machining purposes. The evaluation rubric design and implementation will be created by the teacher Scott Ballard with oversight and

assistance from industry partner Steve Middleton and Terry Heath – both competent, trained machinists.

4. By March 2015, 20% of the CAD/CAM & CNC machining program students will demonstrate a base level of proficiency in the Oregon Skill Set, identified in section MNPH10.01- MNPH10.10 "Machining and Metal Forming." Students will demonstrate this proficiency by participating in the 2015 LBCC Milling and Turning skills competition. In addition, by June 2015, 50% of the CAD/CAM & CNC students will demonstrate their understanding of machining concepts and skills by completing a written knowledge based test of previously cited Oregon Skill Sets with at least 75% accuracy and the ability to operate a mill and/or lathe. The evaluation rubric design and implementation will be created by the teacher Scott Ballard with oversight and assistance from industry partner Steve Middleton and Terry Heath – both competent, trained machinists

5. By the end of trimester two, 2015, a cross curricular unit(s) (including mathematics, science, technical writing) will be completed and implemented, ensuring students the opportunity to apply academic subject matter onto an authentic manufacturing unit of study. Staff will draw upon and revise as needed curriculum created by Joe Dealy and Scott Ballard as previously mentioned in section D. Diploma Connections. This unit of study will be provided to Superintendent Dan Forbess for his evaluation, approval, and recommendations.

6. By June, 2015, meet with LBCC machine tool instructors and have an action plan in place to work towards a full articulation agreement between the PHS machining classes and the LBCC machine tool program. . Our goal is that 25% - approximately 5-7 students - will be proficient and ready to receive LBCC College Now credits.

7. Using the Pinnacle grade and attendance program for specific data collection, we will document that 25% of the projected 15-20 students will participate in CAD/CAM CNC industry job shadow and cooperative work experience. Furthermore, we will continue to request and collect post-job shadow evaluations from our business partners to determine how our students perform on site, are they punctual, dressed appropriately, and aware of proper safety protocol.

8. By June 2015, the number of non-traditional program completers, currently 20%, will show an increase of 50% as measured by the total increase compared to the 2012 -13 school year and this data will be compiled objectively by our counseling department using demographic information provided by our attendance and grading program, Pinnacle. Furthermore, all program completers will take an online proficiency assessment proctored and reported by Perkins funding coordinator Dale Moon of LBCC.

9. By June 2015 our goal is add at least two building and construction partners to compliment current partner Mike Goodrich of Legend Homes. In addition, five or more students will complete the Building and Construction curriculum AND complete job shadow(s) or internships with one of our industry partners. This information will be compiled and recorded by the PHS counseling department and reported to our lead construction industry partner, Mike Goodrich of Legend Homes.

Partnerships

Overall Partner Roles. Philomath High School has consistently partnered with local businesses and Linn-Benton Community College as an essential component to our approved Career & Technical Education programs. Philomath High School had 247

CTE concentrators last year. The 2012 enrollment at PHS was 540 and 455 of those students enrolled in at least one CTE course. The CTE concentrators enrolled in our Marketing, Manufacturing, Health Occupations, Business and Management, Culinary Arts, Forestry/Natural Resources exceeded the State's goals from percentages of students who met or exceeded Oregon benchmarks. As one can see, Career and Technical Education programs are valued in the Philomath School District.

When the CTE Revitalization Grant legislation came out in 2011, our school board, approved CTE program instructors, and advisory committee members met in a public work session to determine what area of focus would most benefit our students and community needs. The group agreed to support the enhancement of our manufacturing technology program, our vision was clear and our partners have stepped forward to ensure our initial and future success. While we were not selected as a 2012 grant recipient, the PHS Manufacturing Program moved forward towards the vision of a more comprehensive CTE program, including the addition of Construction trades, and specifically utilized industry partnerships by getting our students out into job shadows and internships.

Our manufacturing technology advisor committee membership includes the following businesses: 1) CTC, Ed Landis; 2) L & M Welding, Brian Bennett; 3) Evans Precision Tooling, Andy Evans; 4) Bow Tech, and 5) Linn-Benton Community College, Dale Moon, Fred Stuewe, Dean Dowless, Dave Ketler, and Steve Middleton. A new building and construction trades component will be advised by Mike Goodrich of Legend Homes. The committee has met with Scott Ballard on several occasions throughout the last couple years to identify goals and generate resource commitments, in-kind and

material donations, and to provide meaningful job shadows and internships for PHS manufacturing program students.

On-going Monitoring and Implementation. Our advisory committee has indicated they will be actively involved in helping us implement our manufacturing technology enhancement project by engaging staff and students on a regular basis. All of our business partners have promised to provide technical advice on program content, allow the use of their shop equipment, and provide job shadow/work experience placements for students. Our business owners and LBCC partners will meet quarterly with Scott Ballard, Ken Ball, and Dan Forbess to monitor the implementation of our program enhancement efforts afforded by the CTE Revitalization Grant funds, providing technical advice and support in regards to specific industry standards and technician skill sets.

Instructional Involvement. Advisory committee members are planning to devote their personal time and provide machine shop usage, along with donated materials and supplies, as a minimum level of involvement in our project and have shown this commitment over the past 2 years by mentoring several students in technical projects and providing hundreds of hours of job shadowing and full summer internships. All of our advisory committee members expressed a desire to stay engaged with our program for the foreseeable future because they value the effort we are attempting and look forward to employing our graduates. Private sector involvement in the initial and on-going technical instructional strategies is essential and will ensure the long-term success of our efforts beyond the initial grant period.

Initial training on CAD/CAM/CNC equipment and software will be conducted with Steve Middleton, Andrew Hill, and Dan Forbess. As you may know, Mr. Forbess is the Philomath School District Superintendent and a licensed CTE instructor. He has extensive computer aided drafting knowledge with AutoCAD and basic computer aided manufacturing knowledge with MasterCAM. He will be involved and available on a daily basis to help implement our CAD/CAM/CNC manufacturing technology curriculum and instructional program enhancement efforts.

Financial Support. As previously indicated, our business partners have committed to providing their time, materials, supplies, and personal equipment use to ensure there is a valued-added community resource attribute with this project. In addition, local industry partner Hewlett-Packard, has consistently donated $10,000 to $20,000 per year of technology products to our school district through their Employee Giving Match Program. Most recently, the HP employee program donated large LCD flat screen monitors and desktop computer workstations to enhance our CAD lab. Lastly, the Philomath School District continues to support strong Career and Technical Education programs even during the decline of State K-12 funding in Oregon. The Philomath School Board of Directors and superintendent are committed to strong CTE programs, as evidenced by the number of students accessing CTE courses, and will continue to employ a budgeting strategy to support the manufacturing technology enhancement project.

Bonus Sections

A. Career and Technical Student Organizations (CTSO's)

The marriage of our high school's Future Business Leaders of America (FBLA) chapter and the Manufacturing Technology students is naturally complimentary. Their interests blend. One of our aims will be to expand the manufacturing of marketable products and our FBLA will help us get there. Currently, welding students partnered with the Forestry program to design, create, and market wrought iron benches with wooden tops. Manufacturing students will, in turn, become more involved in identifying marketable products, solving more sophisticated design problems, and marketing their products by developing entrepreneurial skills.

Resources saved after the demolition of our high school prior to the 2012 remodel, will allow students to re-use and re-purpose historic building artifacts turning local old growth bleacher and trim wood into high quality items such as picture frames, decorative clocks, rose arbors, and truck trailers. Students will use CAD to design components, apply physics to select materials, movement options, integrate electro-mechanical systems, create written technical documents, and develop a marketing plan for the manufactured product. As part of the thematic unit design, product design and development practices will be taught so that students will experience a small business, real-world manufacturing strategy.

B. Middle School Component

In 2002, Wood Shop classes at Philomath Middle School were cut. The shop, and all its equipment, stood dormant for the next 5 years. It became a storage room

until 2007 when veteran teacher Mark Dorr removed the boxes of clutter and resurrected the program. Since then the number of students has increased consistently over time. The number of classes offered began as a one quarter class and, in 2013-14, is now offered consecutively in all four for the first time.

In order to continue to attract a diverse range of students to CTE classes in our middle school, we would like to add a CNC Router for students to design and create 3-dimentional portraits, decorative signs, and plaques. Large quantities of wood pulled and saved from the old high school prior to remodel will be used for student projects. Re-use of this historic community resource will be a selling point for marketing the student art. This will tie into our business department and will be used for fundraising efforts for various student groups. We see the CNC router as a vehicle to not only inspire student creativity and interest in the trades, but also to provide middle school students with a taste and providing a bridge for student transition into the more technical CTE classes at the high school.

C. Out of School Time Programming

Philomath High School has a strong core of students, teachers, and parents who have sustained the FIRST Robotics Club for more than a decade. PHRED, the Philomath chapter of FIRST, participates yearly in an engineering project where students from schools across the country are given a task sent out by the national FIRST Robotics committee. The team problem solves, plans, and produces a robot to use in the nationwide competition. No group of students will benefit more from our CAD/CAM/CNC improvements than the Philomath Robotics team. They will be able to

design, prototype, and manufacture a variety of components for their competition robots.

Our high school also has a Drag Team that has been around since the late 1970's. The Drag Team uses the manufacturing facility for custom fabrication of race car parts. Technical training and use of the equipment gained from this CTE Grant will provide opportunities for students to have hand-on experience that can lead to job shadows and internships with our partners and ultimately help steer our students towards careers in the trades and technical fields.