Great Oaks Welding & Fabrication Essential Skills Profile

This profile provides an outline of the skills required for successful completion of this career program. Additional information is located on the Great Oaks website at http://hs.greatoaks.com/essential-skills-high-school-programs/ and selecting the corresponding career program.

Recommended WorkKeys® Scores for Welding and Fabrication

Applied Mathematics – 4
Workplace Documents – 4
Graphic Literacy – 4

*Practice tests and more information at https://jobseeker.ohiomeansjobs.monster.com/Assessments/Home.aspx

Recommended Essential Skills to Successfully Complete the Program			
Rating Key:	**Low = Slightly Essential**	**Medium = Essential**	**High = Very Essential**

Key Vocational Factors		**Rating**
Visual Acuity	The ability to detect differences/details visually	High
Depth Perception	The ability to detect the physical distance/depth of objects in space and time	High
Oral Communication	The ability to express/explain ideas	High
Oral Expression	The ability to verbally explain and express self in an intelligible manner so others will understand	High
Written Communication	The ability to communicate in a written format and record information accurately	High
Physical Mobility/Strength	Extended standing, bending, stooping, use of ladders, working inside and outside, working at high levels (heights), and working on roofs or at high levels above the ground, lifting and maneuvering welding equipment and materials	High
Eye-hand Coordination	The ability to use tools	High
Auditory Acuity	The ability to detect differences in pitch and sound	Medium
Safety Understanding	Able to comprehend hazards of working with tools, materials, equipment, and environmental conditions; able to wear personal protective equipment suitable for task	High

Worker Trait Skills	**Rating**
Ability to get along with others	Medium
Ability to work independently, without close supervision	High
Ability to work toward work including tasks of minimal interest	High
Ability to stick to assigned task to a positive/expected conclusion	High

Attendance, dependability and punctuality	High
Ability to work accurately/within industry standards	High
Ability to follow and retain:	
Multistep oral instructions	High
Written instructions/technical manuals - multistep	High
Simple to complex diagram instructions	High
Visual models or demonstrated instructions	High
Ability to use tools of trade (welding masks, man lift or personnel lift, gas welding or brazing or cutting apparatus, electrode holder, drill press or radial drill, hammers, calipers, measuring devices, etc.)	High
Ability to use numerical data (count, measure, compute, etc.) in applied setting	High
Ability to discriminate between objects of similar:	
Size, shape, color and spatial relationships	High
Dexterity-fine finger	High
Ability to organize work process/follow defined procedures	High
Ability to solve problems through a logical process/sequence of steps	High
Coordination (eye-hand)	High
Able to sequence events or follow a sequence as necessary	High
Critical Thinking: Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.	High
Operation and Control: Controlling operations of equipment or systems.	High
Monitoring: Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.	High

Applied Mathematics Skills * Recommended WorkKeys® Scores 4	
Understanding of numbers	Work with whole numbers and decimals. Convert fractions to decimals and/or convert from decimals to percentages.
Mathematical Calculations	Use one or two-step calculations to solve problems, decide what information, calculations or unit conversions to use to answer a problem
Solving problems with math	Solve problems that require mathematical operations with multiple units (e.g. 6 feet 4 inches or 4 hours 30 minutes), identify calculation mistakes
Workplace Documents Skills * Recommended WorkKeys® Scores 4	
Complexity	Straightforward with some longer sentences and may contain conditional situations
Information and detail	Mostly informative and can be several details
Vocabulary	Mostly common with some advanced words
Document type	Informational, instructional and policy-type documents

Graphic Literacy Skills * Recommended WorkKeys® Scores 4	
Using charts/graphs	Locate information in charts or graphs
Interpreting information	Compare two or more pieces of information, identify trends/patterns, make inference and identify graphics that accurately represents data

Additional Recommended Abilities

Near Vision	The ability to see details at close range (within a few feet of the observer).
Arm-Hand Steadiness	The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position.
Control Precision	The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.

Knowledge Required in Welding Field

Production and Processing	Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.
Design	Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.
Administration and Management	Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.
Welding and Cutting Process	Knowledge of safety, setup and application of the following Welding and Cutting Processes: SMAW, GMAW, GTAW, FCAW, OAC, and Thermal Cutting

Additional Considerations

Detail oriented	Will get dirty
May work in harsh environments: water, heat, cold, snow, ice, heights, below ground.	NEED strong computer skills

Must be an independent and dependable worker	Creative and need to solve simple and
Enjoy Science and Math	Strong Math background

Welding Work Activities

Weld components in flat, vertical, or overhead positions.	Operate safety equipment and use safe work habits.
Lay out, position, align, and secure parts and assemblies prior to assembly, using straightedges, combination squares, calipers, and rulers.	Examine workpieces for defects and measure workpieces with straightedges or templates to ensure conformance with specifications.
Recognize, set up, and operate hand and power tools common to the welding trade, such as shielded metal arc and gas metal arc welding equipment.	Clamp, hold, tack-weld, heat-bend, grind or bolt component parts to obtain required configurations and positions for welding.
Weld separately or in combination, using aluminum, stainless steel, cast iron, and other alloys.	Select and install torches, torch tips, filler rods, and flux, according to welding chart specifications or types and thicknesses of metals.
Ignite torches or start power supplies and strike arcs by touching electrodes to metals being welded, completing electrical circuits.	Determine required equipment and welding methods, applying knowledge of metallurgy, geometry, and welding techniques.
Connect and turn regulator valves to activate and adjust gas flow and pressure so that desired flames are obtained.	Monitor the fitting, burning, and welding processes to avoid overheating of parts or warping, shrinking, distortion, or expansion of material.
Operate manual or semi-automatic welding equipment to fuse metal segments, using processes such as gas tungsten arc, gas metal arc, flux-cored arc, plasma arc, shielded metal arc, resistance welding, and submerged arc welding.	Analyze engineering drawings, blueprints, specifications, sketches, work orders, and material safety data sheets to plan layout, assembly, and welding operations.
Mark or tag material with proper job number, piece marks, and other identifying marks as required.	Chip or grind off excess weld, slag, or spatter, using hand scrapers or power chippers, portable grinders, or arc-cutting equipment.
Remove rough spots from work pieces, using portable grinders, hand files, or scrapers.	Preheat work pieces prior to welding or bending, using torches or heating furnaces.
Prepare all material surfaces to be welded, ensuring that there is no loose or thick scale, slag, rust, moisture, grease, or other foreign matter.	Develop templates and models for welding projects, using mathematical calculations based on blueprint information.
Signal crane operators to move large work piece.	Use fire suppression methods in industrial emergencies.
Position and secure work pieces, using hoists, cranes, wire, and banding machines or hand tools.	Guide and direct flames or electrodes on or across work pieces to straighten, bend, melt, or build up metal.

Detect faulty operation of equipment or defective materials and notify supervisors.	Clean or degrease parts, using wire brushes, portable grinders, or chemical baths.
Cut, contour, and bevel metal plates and structural shapes to dimensions as specified by blueprints, layouts, work orders, and templates, using powered saws, hand shears, or chipping knives.	Repair products by dismantling, straightening, reshaping, and reassembling parts, using cutting torches, straightening presses, and hand tools.
Fill holes, and increase the size of metal parts.	Set up and use ladders and scaffolding as necessary to complete work.
Estimate materials needed for production and manufacturing and maintain required stocks of materials.	Check grooves, angles, or gap allowances, using micrometers, calipers, and precision measuring instruments.
Operate metal shaping, straightening, and bending machines, such as brakes and shears.	Mix and apply protective coatings to products.
Join parts such as beams and steel reinforcing rods in buildings, bridges, and highways, bolting and riveting as necessary.	Dismantle metal assemblies or cut scrap metal, using thermal-cutting equipment such as flame cutting torches or plasma-arc equipment.
Gouge metals, using the air-arc gouging process.	Hammer out bulges or bends in metal work pieces.
Operate brazing and soldering equipment.	Melt lead bars, wire, or scrap to add lead to joints or to extrude melted scrap into reusable form.

Technology

Analytical or Scientific software	Spreadsheet software
Calendar and Scheduling software	Database User Interface and Query software
Computer Aided Design (CAD) software	

Certifications Students Can Earn

Credential	Ohio Graduation Points
American Welding Society Certified Welder	12
American Welding Society Pre-qualification	9
Forklift Operations	2
OSHA 10 – General Industry	1
CPR/First Aid	1

Possible College Credits

College Credit Plus (CCP)	The CCP program provides Ohio high school students an opportunity to complete college courses and earn transcripted credit.
Career Technical Assurance Guides (CTAGs)	CTAGs award college credit for career-technical coursework to students who complete an approved course and earn a qualifying score on the end of course exam.
Articulated Credit	Some Great Oaks career-technical programs have agreements with colleges where student can earn credit toward a specific degree.

Please speak with your school counselor, Great Oaks counselor and/or career technical instructor to learn more about these potential opportunities.

Possible Career Pathways

Construction Welder	Pipeline Construction Welder
Aerospace Welder	Custom/Specialty Welder
Welding Supplier	Service Technician
Welding Inspector	Fabricator