

	<h2>Great Oaks Welding Essential Skills Profile</h2>
<p>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 <a href="http://hs.greatoaks.com/essential-skills-high-school-programs/">http://hs.greatoaks.com/essential-skills-high-school-programs/</a> and selecting the corresponding career program.</p>	

### Recommended Work Keys Scores for Welding

Applied Mathematics-4	Graphic Literacy-4
Workplace Documents-4	

\*Practice tests and more information at [www.act.org/workkeys](http://www.act.org/workkeys)

Essential Skills Needed to Successfully Complete the Program			
<b>Rating Key:</b>	<b>Low = Slightly Essential</b>	<b>Medium = Essential</b>	<b>High = Very Essential</b>

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	Medium
Oral Communication	The ability to express/explain ideas.	Medium
Oral Expression	The ability to verbally explain and express self in an intelligible manner so others will understand	Medium
Written Communication	The ability to communicate in a written format and record information accurately	Medium
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:	

Multi step oral instructions	Medium
Written instructions/technical manuals-multi step	Medium
Simple to complex diagram instructions	Medium
Visual models or demonstrated instructions	Medium
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	Medium
Ability to discriminate between objects of similar: Size, shape, color and spatial relationships	Medium
Dexterity-fine finger	Medium
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

<b>Reading Skills *See Recommended Work Key Scores</b>	
<b>Math Skills *See Recommended Work Key Scores</b>	
Counting-Recording-Comparing-Calculating	Whole numbers and decimals
Calculating Fractions, decimals, ratios, order of operations	Geometry
Ratio, Algebra, Formulas, Square Roots	

### **Additional Abilities Required**

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

### **Knowledge Required in Welding Field**

<b>Production and Processing</b>	Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.
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<b>Design</b>	Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.
<b>Administration and Management</b>	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.
<b>Welding and Cutting Process</b>	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	May get dirty
May work in harsh environments: water, heat, cold, snow, ice, heights, below ground, etc.	NEED strong computer skills
Must be an independent and dependable worker	Creative
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.

### Welding Work Activities

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.	Remove 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
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Calendar and scheduling software	Data base user interface and query software
Computer aided design CAD software	

**Available Certifications**

American Welding Society Certification (AWS) (12 Points)	CPR/First Aid Certification (1 Point)
OHSA 10-General Industry (1 Point)	ECSI (Emergency Care and Safety Institute)

**Possible College Credits**

College Credit Plus in English, Math, Social Studies, or Science	Must be preapproved. Must pass a college course at an Ohio college or College Credit Plus class at Great Oaks.
Articulated Credit	Great Oaks has agreements with certain colleges that may give you credits for a specific degree. Possible agreements are: <ul style="list-style-type: none"> <li>• Sinclair Community College (Welding, up to 7 credit hours possible)</li> <li>• Cincinnati State Technical and Community College (Mechanical Engineering Technology, up to 9 credit hours possible)</li> </ul>
Career Technical Credit Transfer	The Ohio Transfer to Degree Guarantee helps career and technical students transfer credits earned in high school to community college or four-year degree programs. The credit can be used at any Ohio public college or university: <ul style="list-style-type: none"> <li>• If you successfully completed your career-technical program and passed certain required assessments.</li> <li>• If you attend a similar program at a public Ohio college or university.</li> </ul> <p>For more information, go to <a href="http://www.transfercredit.ohio.gov">www.transfercredit.ohio.gov</a></p>

\*Additional college or post-secondary education may be required in this field

**Possible Career Pathways**

Welder	Inspector
Robotic welding operator/programmer	Metal fabricator