



MACHINING

Youth Apprenticeship

MACHINING

Machining youth apprentices assist with basic machine operations, processes, and tools. Apprentices must adhere to industry safety and security standards.

Length of Apprenticeship: One Year

COMPETENCIES

Machining youth apprentices must complete a **total of 21 competencies**. All 7 Manufacturing Fundamentals Competencies must be complete. No substitutions to this list. **Thirteen** of the 14 Machining competencies listed below must be complete. Employers can substitute up to **1** competency with another occupationally appropriate skill. Substitutions must be added to the competency list for assessment. Note that where necessary, skills can be simulated.

***Students who completed a previous Manufacturing YA program do *not* need to repeat the Manufacturing Fundamentals Competencies.

Manufacturing Fundamentals Competencies	Machining Competencies
<ol style="list-style-type: none"> 1. Focus on customer needs 2. Use various instruments 3. Operate tools and equipment safely 4. Practice quality assurance principles 5. Follow personal safety requirements 6. Maintain a safe work environment 7. Demonstrate professional role to be used in an emergency 	<ol style="list-style-type: none"> 1. Read machining technical drawings and work orders 2. Interpret machining symbols and procedures 3. Identify set up 4. Select tools and materials 5. Perform safety checks 6. Support set up 7. Verify set up 8. Perform start up 9. Operate machining equipment 10. Monitor machining product and process specifications 11. Process production documents 12. Follow shutdown machining process 13. Use hand tools 14. Monitor equipment for correct operation

REGISTERED APPRENTICESHIP BRIDGING OPPORTUNITIES

Some of the related instruction courses can bridge into the following registered apprenticeship:

- Machine Repair

POST-SECONDARY PATHWAY OPPORTUNITIES

There are several post-secondary pathway opportunities in this area. Following is partial list.

- Precision Machining Technology Technical Diploma



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Youth Apprenticeship
ON-THE-JOB LEARNING PERFORMANCE STANDARDS GUIDE

YOUTH APPRENTICE INFORMATION

Youth Apprentice Name	
YA Coordinator	YA Consortium
School District	High School Graduation Date

REQUIREMENTS

Requirements

Youth apprentices must complete ALL the items listed below. Check completed areas.

- Competency checklist
- Employability Skills checklist (in this job book) or the DPI Employability Skills Certificate
- Related instruction equal to 1 high school credit or at least 3 college credits
- Minimum of 450 work hours

HOURS

Record the hours the youth apprentice worked.

Total Hours Employed	Company Name	Telephone Number

COMPETENCIES

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Rating Scale

3: Exceeds entry level criteria | Requires minimal supervision | Consistently displays this behavior

2: Meets entry level criteria | Requires some supervision | Often displays this behavior

1: Needs improvement | Requires much assistance and supervision | Rarely displays behavior

MANUFACTURING FUNDAMENTALS – Complete all competencies

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p>1. Focus on customer needs</p> <ul style="list-style-type: none"> Identify internal and external customers impacted by the production process Satisfy internal and external customer's expectations Collaborate with team Assist work site professional to keep internal and/or external customers informed of project progress and decisions that may affect them Define the impact of the Voice of the Customer Determine the impact of your work to the internal and external customer 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p>2. Use various instruments</p> <ul style="list-style-type: none"> • Consider the degree of precision required by the part feature • Choose correct measuring instrument for task • Verify equipment is available for use and in working order • Verify equipment preventative maintenance and/or calibration • Inspect tools and work area for safety considerations • Clean and adjust measuring instrument prior to use • Use gauges, calipers, and micrometer instruments • Use semi-precision and precision layout tools • Use digital gauges, checking fixtures • Use digital scales, thermometers • Confirm measurement accuracy • Record measurement correctly including unit of measurement at proper interval • Calibrate, clean, and store measuring instruments properly • Convert standard to metric – metric to standard measurement units 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>3. Operate tools and equipment safely</p> <ul style="list-style-type: none"> • Operate only tool/equipment that he/she is trained on • Choose correct tool/equipment for the task • Follow tool check list • Verify tool/equipment is available for use and in working order • Verify tool/equipment is current for preventative maintenance and/or calibration • Wear appropriate Personal Protective Equipment (PPE) • Inspect tool/equipment and work area for safety considerations • Prepare tool/equipment for safe operation • Operate tool/equipment safely with guarding devices • Monitor tool/equipment for safe operation while operating • Compare tool/equipment performance regularly to optimal equipment operations • Follow facility procedures for clean-up and shut down after use • Perform required preventative maintenance procedures • Report abnormal tool/equipment conditions • Properly shuts down and labels any tool/equipment that is not operating as expected • Follow Lock Out/Tag Out procedures as applicable • Document use and maintenance 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p>4. Practice quality assurance principles</p> <ul style="list-style-type: none"> • Inspect materials/piece/product at all stages of production • Identify quality or condition of materials/piece/product • Monitor materials, processes, equipment, tools, and products throughout the production process • Inspect final product/piece to ensure it meets specifications • Identify and segregate materials and/or product that do not meet specification • Communicate with work site professional if materials/product do not meet requirements • Document all quality checks • Participate in root-cause analysis of process/product • Take ownership of work • Collaborate with work site professional on corrective action 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>5. Follow personal safety requirements (safety)</p> <ul style="list-style-type: none"> • Participate in required safety training • Follow all worksite guidelines for personal safety • Apply principles of proper body mechanics • Report exposures, injuries, near misses, or accidents, personal or to others immediately • Locate key information on Material Safety Data Sheets (MSDS) • Handle and dispose of any hazardous materials appropriately • Operate equipment that he/she is trained on • Adhere to equipment safety standards • Visually inspect equipment before operation • Wear required Personal Protective Equipment (PPE) at all times • Follow company emergency action plan • Identify hazardous conditions and restricted areas in the workplace • Avoid pinch points • Be aware of surroundings 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p>6. Maintain a safe work environment (safety)</p> <ul style="list-style-type: none"> • Comply with posted safety warnings and symbols • Identify unsafe conditions and/or work habits • Report unsafe conditions and/or work habits • Help maintain a clean and safe working environment free of debris and obstacles • Maintain clean, organized work area • Use hazardous materials according to company procedure • Report any indications of insects or pests, if necessary • Follow appropriate Lock out – tag out procedures • Adhere to Occupational Safety and Health Administration (OSHA) Safety guidelines • Follow rules for operating equipment (Powered Industrial Vehicle PIV) • Identify applicable Emergency Stops 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>7. Demonstrate professional role to be used in an emergency (safety)</p> <ul style="list-style-type: none"> • Participate in emergency safety simulations and drills • Describe company’s policy and procedures for work site incidents, accidents, electrical, fire, tornado, bomb threats, robbery, hostage situations, and other emergency situations • Identify the closest fire alarms and emergency exits • Identify the fire extinguishers • Identify appropriate alarms and procedures for using alarms • Contact emergency personnel in the event of an emergency • Contribute to emergency incident documentation 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Comments:</p>			

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	1	2	3
1. Read machining technical drawings and work orders <ul style="list-style-type: none"> Review technical drawing Gather reference materials Determine type of print and views Determine material specifications Determine critical dimensions and tolerances Analyze supplementary data Determine machining instructions and specifications Interpret machining symbols and procedure 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Interpret machining symbols and procedures <ul style="list-style-type: none"> Interpret technical drawings accurately for machining tasks Use appropriate terminology Identify lines, views, symbols, and representations on the drawings Interpret dimensions, tolerances, and scale on the drawings Interpret threads, tapers, and shop notes on the drawings Interpret the machining plan from a technical drawing 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Identify set up <ul style="list-style-type: none"> Review applicable technical drawings, work orders, and/or procedures Plan sequencing, tools, and equipment Identify set up needed Verify production schedule, deadlines, and timeframes with worksite professional 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Select tools and materials <ul style="list-style-type: none"> Select tools and machining equipment Select appropriate work holding devices for work piece and equipment Check raw materials needed against work order Verify raw material(s) meet specifications Gather all resources needed at the workstation Notify work site professional of discrepancies 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p>5. Perform safety checks</p> <ul style="list-style-type: none"> • Review machining procedure to be used • Review safety requirements of equipment procedure • Verify safety equipment needed for machining process • Verify Personal Protective Equipment (PPE) needed for machining process • Inspect tools and work area for safety considerations • Examine equipment labeling and safeguarding 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>6. Support set up</p> <ul style="list-style-type: none"> • Assemble tools and machining equipment • Adjust tools and machining equipment • Verify machining equipment is available for use and in working order • Verify machining equipment is current for preventative maintenance and/or calibration • Calculate needed control settings • Check fluid, oil, air, pressure levels • Set machining equipment parameters • Install work holding devices so they are secure, aligned, and do not interfere with the machining • Mount, dress, and balance selected grinding wheel for the operation • Select appropriate lathe tool bit and holder for lathe process • Sharpen lathe punches, drill bits, and chisels • Stage lathe pieces and raw materials for machining • Select correct blade or cut-off wheel. • Assure blade is properly sharp and in good condition • Stage raw material for cut-off 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>7. Verify set up</p> <ul style="list-style-type: none"> • Verify set up meets machining requirements and product specifications • Examine first piece/product or production run for visual and/or dimensional specification • Make adjustments to ensure piece/product meets specification • Verify repeatability of set up if applicable • Document set up procedure for repeatability 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>8. Perform start up</p> <ul style="list-style-type: none"> • Review start-up safety procedures • Verify correct set up of equipment adjustments • Inspect piece/product • Document start up procedure 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p>9. Operate machining equipment</p> <ul style="list-style-type: none"> • Wear the required Personal Protective Equipment (PPE) • Cycle equipment • Operate equipment safely • Operate equipment according to machine requirements • Monitor equipment for correct operation while operating 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>10. Monitor machining product and process specifications</p> <ul style="list-style-type: none"> • Monitor piece/product machined for specification • Monitor the machining and equipment for performance • Adjust the process for quality and/or productivity • Take corrective actions to resolve problems as they occur • Replenish processing materials • Test piece/product for function • Label pieces/products for compliance or non-compliance • Document quality control checks • Grind pieces to specified tolerances • Pieces show no sign of burn marks • Pieces are smooth and free of burrs • Notify work site professional of discrepancies 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>11. Process production documents</p> <ul style="list-style-type: none"> • Document processing data • Verify fabrication and production documentation is completed • Documentation is legible • Documentation is complete • Documentation is in appropriate format • Documentation is stored or forwarded as required • Pieces are correctly stored or staged 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>12. Follow shutdown machining process</p> <ul style="list-style-type: none"> • Review procedure to be used • Stop production process • Verify all equipment is shut down safely • Identify any process or equipment maintenance concerns with the production run • Take corrective action to report and correct maintenance concerns 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
13. Use hand tools <ul style="list-style-type: none"> • Cut metal stock with a hand hacksaw • Cut threads with hand taps and dies • Ream holes with hand reamer • Tap holes using hand tools • Deburr using hand tools • Band material safely • Verify piece(s) meet specification 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Monitor equipment for correct operation <ul style="list-style-type: none"> • Review equipment quality measures for trends and problems as required • Compare current equipment performance to optimal equipment • Report noted deviations from expected performance • Ensure equipment is properly labeled • Remove inoperative equipment from production • Assist work site professional to investigate abnormal equipment • Assist work site professional to follow up on repaired equipment 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competency Substitute (if you replaced a competency above, note the competency and rating)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:			

RELATED INSTRUCTION

Indicate which related instruction courses the youth apprentice completed:

Course Title	Credits	Location