Identifier	Poplar - Journeyman - Welding		Introduced	Completed
J W 1	**GENERAL LAB SAFETY**			
J W 1.1.01	General Rules	Pass safety test.		
J W 1.1.02	General Rules	Identify and utilize proper storage for flammables.		
J W 1.1.03	General Rules	Identify ventilation hazards and take corrective action.		
J W 1.1.04	General Rules	Identify and report electrical hazards.		
J W 1.1.05	General Rules	Demonstrate the ability to keep a clean, orderly, and safe work area.		
J W 1.1.06	General Rules	Demonstrate safe use of personal protective equipment.		
J W 1.1.07	General Rules	Demonstrate safe use of machines, tools, and equipment.		
J W 1.1.08	General Rules	Portray safe behaviors/attitudes while in the working environment.		
J W 1.1.09	General Rules	Explain proper steps in reporting an injury/accident or emergency.		
J W 1.1.10	General Rules	Demonstrate proper lifting techniques.		
J W 1.1.11	General Rules	Identify and use hearing protection when needed.		
J W 1.1.12	General Rules	Explain the purpose of OSHA.		
J W 1.1.13	General Rules	Demonstrate the safe handling of compressed gases under the direct supervision of the instructor.		
J W 1.2.01	Fire Safety Rules	Describe the use of fire extinguishers and blankets.		
J W 1.2.02	Fire Safety Rules	Discuss the various types of fires for Class A, B, C, & D.		
J W 1.2.03	Fire Safety Rules	Demonstrate fire evacuation procedures.		
J W 1.2.04	Fire Safety Rules	Discuss and list potential fire hazards that exist in the welding lab.		
J W 1.2.05	Fire Safety Rules	Demonstrate use of ventilation system controls in the welding lab.		
J W 1.2.06	Fire Safety Rules	Recognize need and demonstrate use of personal respirators in the welding lab.		
J W 1.2.07	Fire Safety Rules	Demonstrate proper storage of flammable materials.		
J W 2	**MEASUREMENT AND LAYOUT TECHNIQUES**			
J W 2.1.01	Measurement	Demonstrate the use of semi-precision measuring devices to 1/64".		
J W 2.1.02	Measurement	Demonstrate the use of precision measuring devices to include micrometers and Vernier calipers to 0.001".		
J W 2.2.01	Layout tools	Demonstrate use of a combination square set, dividers, scratch awls, layout fluid, soap stone, framing square, levels, trammel points and center punch.		
J W 2.2.02	Layout tools	Demonstrate use of bar and c-clamps, jigs and fixtures.		
J W 2.2.03	Layout tools	Demonstrate the use of layout equipment to the tolerance of 1/16" or 0.5° to complete assigned projects.		
J W 2.3.01	Interpret Prints	Interpret basic welding symbols and prints.		
J W 2.3.02	Interpret Prints	Use orthographic projections to complete required assignments.		
J W 2.3.03	Interpret Prints	Develop a working drawing with a bill of materials.		
J W 2.4.01	Mathematical Skills	Calculate math solutions using whole numbers, fractions, and decimals as they relate to welding projects.		
J W 2.4.02	Mathematical Skills	Solve mathematical problems using handbooks, tables, charts, and graphs.		
J W 2.4.03	Mathematical Skills	Identify units of measurement including lineal and volumetric.		
J W 2.4.04	Mathematical Skills	Calculate the cost of materials.		
J W 3	**METALLURGY**			
J W 3.1.01	Types and Shapes	Perform a spark test to determine ferrous from non-ferrous materials.		
J W 3.1.02	Types and Shapes	Identify metals such as steel, cast iron, aluminum, stainless steel, copper, brass, and zinc.		
J W 3.1.03	Types and Shapes	Define properties used to identify common metals (i.e., tensile strength, hardness, malleability, ductility).		
J W 3.1.04	Types and Shapes	List the five most common shapes of metal.		
J W 3.1.05	Types and Shapes	Identify thickness by using a wire gauge.		
J W 3.2.01	Effects	Describe expansion and contraction as a result of heating and cooling metals.		
J W 3.2.02	Effects	Demonstrate safe methods of handling hot metals.		
J W 3.2.03	Effects	Demonstrate the annealing process.		
J W 3.2.04	Effects	Explain the need for pre-, intermediate-, and post-heating techniques.		
J W 4	**TOOLS AND MACHINES**			
J W 4.1.01	Stationary Machines	Demonstrate safe work practices for stationary power machines, including but not limited to: grinders, buffers, sanders, band saws, chop saws, shears, and presses.		
J W 4.2.01	Portable Machines	Demonstrate safe work practices for portable power machines, including but not limited to: grinders, buffers, sanders, band saws, shears, and drills.		
J W 4.3.01	Welding Machines	Demonstrate safe work practices for hand tools, including but not limited to: pliers, files, chisels, punches, hard face and soft face hammers, hacksaw, vises, and brushes.		
J W 5	**OXY-FUEL WELDING/ CUTTING**			
J W 5.1.01	Protection	Identify and list personal safety equipment in the welding lab.		
J W 5.1.02	Protection	Demonstrate appropriate use of personal safety equipment necessary to complete assigned projects.		
J W 5.1.03	Protection	Demonstrate the proper use of ventilation.		
J W 5.1.04	Protection	Demonstrate the proper use of personal respiration equipment.		
J W 5.2.01	Welding Equipment	Select and safely operate oxy-fuel welding equipment used to complete assigned projects.		
J W 5.2.02	Welding Equipment	Layout, cut, and fit materials (such as pipe, plate and structural shapes).		
J W 5.2.03	Welding Equipment	Identify types of fuel gasses and their application.		
J W 5.2.04	Welding Equipment	Identify, select, and setup oxy-fuel welding equipment used to complete assigned projects.		

Identifier	Poplar - Journeyman - Welding		Introduced	Completed
J W 5.2.05	Welding Equipment	Identify safe handling procedures of cylinders.		
J W 5.2.06	Welding Equipment	Demonstrate proper methods of cleaning and care of oxy-fuel welding equipment.		
J W 5.2.07	Welding Equipment	Select and exchange oxy-fuel welding attachments.		
J W 5.2.08	Welding Equipment	Identify, select, and use proper filler materials.		
J W 5.3.01	Cutting Equipment	Select and safely operate oxy-fuel cutting equipment used to complete assigned projects.		
J W 5.3.02	Cutting Equipment	Layout, cut, and fit materials (such as pipe, plate, and structural shapes).		
J W 5.3.03	Cutting Equipment	Identify types of fuel gasses and their application.		
J W 5.3.04	Cutting Equipment	Identify, select, and setup oxy-fuel cutting equipment used to complete assigned projects.		
J W 5.3.05	Cutting Equipment	Identify safe handling procedures of cylinders.		
J W 5.3.06	Cutting Equipment	Demonstrate proper methods of cleaning and care of oxy-fuel cutting equipment.		
J W 5.3.07	Cutting Equipment	Select and exchange oxy-fuel cutting attachments.		
J W 5.4.01	Brazing	Select and safely operate oxy-fuel brazing equipment to complete assigned projects.		
J W 5.4.02	Brazing	Prepare materials properly for brazing.		
J W 5.4.03	Brazing	Identify types of fuel gasses and their application.		
J W 5.4.04	Brazing	Identify, select, and setup oxy-fuel brazing equipment used to complete assigned projects.		
J W 5.4.05	Brazing	Identify and select proper filler and flux materials.		
J W 5.4.06	Brazing	Identify safe handling procedures of cylinders.		
J W 5.4.07	Brazing	Demonstrate proper methods of cleaning and care of oxy-fuel brazing equipment.		
J W 5.4.08	Brazing	Select and exchange oxy-fuel brazing attachments.		
J W 6	**SHIELDED METAL ARC WELDING**			
J W 6.1.01	Procedures	Identify, list, and evaluate safety concerns common to the SMAW process.		
J W 6.1.02	Procedures	Identify the different components of electricity and how they relate to the SMAW welding process.		
J W 6.1.03	Procedures	Identify the polarities and currents used in SMAW.		
J W 6.1.04	Procedures	Identify and explain the different types of power sources used for SMAW.		
J W 6.1.05	Procedures	Identify and report potential electrical safety hazards utilizing SMAW.		
J W 6.2.01	Select and Setup	Identify, select, and setup SMAW equipment.		
J W 6.2.02	Select and Setup	Select appropriate electrodes to complete assignments with SMAW.		
J W 6.2.03	Select and Setup	Identify proper electrode storage for SMAW.		
J W 6.2.04	Select and Setup	Select appropriate polarity and current settings for SMAW.		
J W 6.3.01	Safety	Select and safely operate SMAW equipment used to complete assigned projects.		
J W 6.3.02	Safety	Select appropriate electrodes to complete assignments using SMAW.		
J W 6.3.03	Safety	Demonstrate proper selection and use of ventilation with SMAW.		
J W 6.3.04	Safety	Demonstrate proper use of personal respiration for SMAW.		
J W 6.3.05	Safety	Demonstrate proper cleaning and joint preparation for SMAW.		
J W 6.3.06	Safety	Demonstrate striking an arc and running a bead with SMAW.		
J W 6.3.07	Safety	Demonstrate the ability to weld in the flat, horizontal, and vertical positions to complete an assigned project with SMAW.		
J W 7	**GAS METAL ARC WELDING**			
J W 7.1.01	Procedures	Identify, list, and evaluate safety concerns common to the GMAW process.		
J W 7.1.02	Procedures	Identify the different components of electricity and how they relate to the welding GMAW process.		
J W 7.1.03	Procedures	Identify the polarities, wire feed speeds, and voltages used in GMAW.		
J W 7.1.04	Procedures	Identify and explain the different types of power sources used for GMAW.		
J W 7.1.05	Procedures	Identify and report potential electrical safety hazards utilizing GMAW.		
J W 7.1.06	Procedures	Differentiate between metal transfer methods working with GMAW.		
J W 7.2.01	Select and Setup	Identify, select, and setup GMAW equipment.		
J W 7.2.02	Select and Setup	Select appropriate wire, size, and type to complete assignments with GMAW.		
J W 7.2.03	Select and Setup	Select appropriate voltage and wire feed speed settings to complete assignment using GMAW.		
J W 7.2.04	Select and Setup	Demonstrate proper maintenance for wire delivery systems with GMAW.		
J W 7.2.05	Select and Setup	Select appropriate gas and flow rate to complete assignment using GMAW.		
J W 7.3.01	Safety	Select and safely operate GMAW equipment used to complete assigned projects.		
J W 7.3.02	Safety	Select appropriate wire to complete assignments using GMAW.		
J W 7.3.03	Safety	Demonstrate proper selection and use of ventilation with GMAW.		
J W 7.3.04	Safety	Demonstrate proper use of personal respiration for GMAW.		
J W 7.3.05	Safety	Demonstrate proper cleaning and joint preparation for GMAW.		
J W 7.3.06	Safety	Demonstrate starting an arc and running a bead with GMAW.		
J W 7.3.07	Safety	Demonstrate the ability to weld in the flat, horizontal, and vertical positions to complete an assigned project with GMAW.		
J W 8	**FLUX CORE ARC WELDING**			
J W 8.1.01	Procedures	Identify, list and evaluate safety concerns common to the FCAW process.		
J W 8.1.02	Procedures	Identify the different components of electricity and how they relate to the FCAW process.		
J W 8.1.03	Procedures	Identify the polarities and currents used in FCAW.		
J W 8.1.04	Procedures	Identify and explain the different types of power sources used with FCAW.		
J W 8.1.05	Procedures	Identify and report potential electrical safety hazards utilizing FCAW.		

Identifier	Poplar - Journeyman - Welding		Introduced	Completed
J W 8.2.01	Select and Setup	Identify, select, and safely setup FCAW equipment.		
J W 8.2.02	Select and Setup	Select appropriate polarity and current settings for FCAW.		
J W 8.2.03	Select and Setup	Select appropriate wire, size, and type, to complete assignments with FCAW.		
J W 8.2.04	Select and Setup	Select appropriate voltage and wire feed speed settings using FCAW.		
J W 8.2.05	Select and Setup	Demonstrate proper maintenance for wire delivery systems with FCAW.		
J W 8.3.01	Safety	Select and safely operate FCAW equipment used to complete assigned projects.		
J W 8.3.02	Safety	Demonstrate proper selection and use of ventilation with FCAW.		
J W 8.3.03	Safety	Demonstrate proper use of personal respiration for FCAW.		
J W 8.3.04	Safety	Demonstrate proper cleaning and joint preparation for FCAW.		
J W 8.3.05	Safety	Demonstrate starting an arc and running a bead with FCAW.		
J W 8.3.06	Safety	Demonstrate the ability to weld in the flat, horizontal, and vertical positions to complete an assigned project with FCAW.		
J W 9	**GAS TUNGSTEN ARC WELDING**			
J W 9.1.01	Procedures	Identify, list, and evaluate safety concerns common to the GTAW process.		
J W 9.1.02	Procedures	Identify the different components of electricity and how they relate to the GTAW process.		
J W 9.1.03	Procedures	Identify the polarities, currents, and modes of high frequencies used in GTAW.		
J W 9.1.04	Procedures	Identify and explain the different types of power sources used with GTAW.		
J W 9.1.05	Procedures	Identify and report potential electrical safety hazards utilizing GTAW.		
J W 9.2.01	Select and Setup	Identify, select, and safely setup GTAW equipment.		
J W 9.2.02	Select and Setup	Select appropriate electrodes to complete assignments with GTAW.		
J W 9.2.03	Select and Setup	Identify proper electrode preparation for GTAW.		
J W 9.2.04	Select and Setup	Select appropriate polarity and current settings for GTAW.		
J W 9.2.05	Select and Setup	Select appropriate filler material, size and type, to complete GTAW assignments.		
J W 9.2.06	Select and Setup	Select appropriate current and high frequency mode for utilizing GTAW.		
J W 9.2.07	Select and Setup	Select appropriate gas, flow rate, and post flow for using GTAW.		
J W 9.3.01	Safety	Select and safely operate GTAW equipment used to complete assigned projects.		
J W 9.3.02	Safety	Demonstrate proper selection and use of ventilation with GTAW.		
J W 9.3.03	Safety	Demonstrate proper use of personal respiration for GTAW.		
J W 9.3.04	Safety	Demonstrate proper cleaning and joint preparation for GTAW.		
J W 9.3.05	Safety	Demonstrate starting an arc and running a bead with GTAW.		
J W 9.3.06	Safety	Demonstrate the ability to weld in the flat, horizontal, and vertical positions to complete an assigned project with GTAW.		
J W 10	**PLASMA ARC CUTTING**			
J W 10.1.01	Procedures	Identify, list, and evaluate safety concerns common to the Plasma Arc Cutting process.		
J W 10.1.02	Procedures	Identify the different components of plasma and how they relate to the Plasma Arc Cutting process.		
J W 10.1.03	Procedures	Identify and explain the type of power source used with Plasma Arc Cutting.		
J W 10.1.04	Procedures	Identify and report potential electrical safety hazards utilizing Plasma Arc Cutting.		
J W 10.2.01	Select and Setup	Identify, select, and safely setup Plasma Arc Cutting equipment.		
J W 10.2.02	Select and Setup	Select appropriate nozzles and current setting to complete Plasma Arc Cutting assignments.		
J W 10.2.03	Select and Setup	Identify proper sequence for assembling Plasma torch components.		
J W 10.2.04	Select and Setup	Select appropriate flow rate for compressed air for using Plasma Arc Cutting.		
J W 10.3.01	Safety	Select and safely operate Plasma Arc Cutting equipment used to complete assigned projects.		
J W 10.3.02	Safety	Select appropriate nozzles and air pressure to complete Plasma Arc Cutting assignments.		
J W 10.3.03	Safety	Demonstrate proper selection and use of ventilation while utilizing Plasma Arc Cutter.		
J W 10.3.04	Safety	Demonstrate proper use of personal respiration with the Plasma Arc Cutter.		
J W 11	**FABRICATION**			
J W 11.1.01	Techniques	Demonstrate the ability to construct projects in a proper sequence.		
J W 11.1.02	Techniques	Demonstrate the ability to tack metal together to specification.		
J W 11.1.03	Techniques	Demonstrate the ability to layout projects to blue prints.		
J W 11.1.04	Techniques	Demonstrate the ability to cut miter joints to specific angles.		
J W 11.1.05	Techniques	Demonstrate the ability to check work for accuracy.		
J W 11.1.06	Techniques	Demonstrate the ability to safely use tools, including but not limited to: band saws, chop saws, grinders, drills, torches, and clamping devices.		
J W 11.1.07	Techniques	Demonstrate safe handling of long and/or heavy objects.		
J W 11.1.08	Techniques	Demonstrate the ability to de-burr sharp edges.		
J W 12	**WELD TESTING**			
J W 12.1.01	Non-Destructive	Prepare a sample for a non-destructive test.		
J W 12.1.02	Non-Destructive	Inspect for undercutting, overlap, porosity, slag, spatter, and surface cracks.		
J W 12.1.03	Non-Destructive	Identify and list several of the non-destructive examination processes.		
J W 12.2.01	Destructive	Prepare a coupon for destructive test.		
J W 12.2.02	Destructive	Perform a destructive test on weld coupon.		
J W 13	**EMPLOYABILITY**			
J W 13.1.01	Problem Solving	Solve a welding problem using the appropriate steps in the problem-solving process.		
J W 13.1.02	Problem Solving	Demonstrate brainstorming techniques.		

Identifier	**Poplar - Journeyman - Welding**		Introduced	Completed
J W 13.1.03	Problem Solving	Examine and explain the advantages and disadvantages of alternative solutions to one or more problems.		
J W 13.1.04	Problem Solving	Create an action plan based upon a solution to a welding problem.		
J W 13.1.05	Problem Solving	Identify the benefits of solving a welding problem.		
J W 13.2.01	Critical Thinking	Identify and explain the essential elements of the critical-thinking process as related to the welding trades.		
J W 13.2.02	Critical Thinking	Demonstrate critical-thinking skills necessary in the welding trades.		
J W 13.2.03	Critical Thinking	Explain how emotional thinking and logical thinking affect decision making in the welding trades.		
J W 13.2.04	Critical Thinking	Explain the difference between reliable and unreliable observations and statements of fact.		
J W 13.2.05	Critical Thinking	Recognize patterns or relationships through observation and discovery.		
J W 13.3.01	Speak, Write, Listen	Explain the benefits of effective communication skills in the workplace.		
J W 13.3.02	Speak, Write, Listen	Effectively interpret and respond to verbal and nonverbal messages.		
J W 13.3.03	Speak, Write, Listen	Demonstrate proper telephone etiquette.		
J W 13.3.04	Speak, Write, Listen	Effectively communicate thoughts, ideas and information in writing.		
J W 13.3.05	Speak, Write, Listen	Organize ideas and communicate orally; is able to effectively demonstrate job skills to others.		
J W 13.3.06	Speak, Write, Listen	Locate, understand and interpret written information in documents such as manuals, graphs and schedules.		
J W 13.3.07	Speak, Write, Listen	Select and utilize an appropriate medium for conveying messages with dignity and respect.		
J W 13.3.08	Speak, Write, Listen	Organize information into the appropriate format in accordance with standard practices, which includes prewriting, drafting, proofreading, editing/revising, and preparing final copy.		
J W 13.3.09	Speak, Write, Listen	Demonstrate sensitivity to cultural diversity in communication.		
J W 13.3.10	Speak, Write, Listen	Identify common communication barriers and methods for improving communication.		
J W 13.4.01	Technology	Demonstrate ability to utilize basic keyboarding techniques.		
J W 13.4.02	Technology	Demonstrate ability to utilize other input devices.		
J W 13.4.03	Technology	Demonstrate ability to utilize various electronic research methods.		
J W 13.4.04	Technology	Demonstrate knowledge of the basic technology systems currently available and how they apply to your field (i.e., word processing, spreadsheets, multimedia applications and databases).		
J W 13.4.05	Technology	Investigate and explain the use, benefits, and costs of technological developments in the workplace and school.		
J W 13.4.06	Technology	Identify and demonstrate the appropriate use of technology to enhance the efficiency of the workplace and school.		
J W 13.4.07	Technology	Demonstrate routine maintenance and repair of technological equipment.		
J W 13.5.01	Leadership and Teamwork	Work cooperatively with others when given group project.		
J W 13.5.02	Leadership and Teamwork	Explain traits necessary to effectively lead and influence individuals and groups.		
J W 13.5.03	Leadership and Teamwork	Demonstrate appropriate attitudes and behaviors for effective leadership.		
J W 13.5.04	Leadership and Teamwork	Demonstrate respect for team members, team processes, and team goals.		
J W 13.5.05	Leadership and Teamwork	Participate in the implementation of a group's decision and evaluate the results.		
J W 13.5.06	Leadership and Teamwork	Demonstrate the qualities of an effective leader and team member.		
J W 13.5.07	Leadership and Teamwork	Describe the importance of a proper dress code.		
J W 13.6.01	Ethics	Develop personal work ethics through work experience.		
J W 13.6.02	Ethics	Describe the importance of ethics practiced in the workplace.		
J W 13.6.03	Ethics	Demonstrate regular attendance, promptness, and the willingness to follow instructions and complete an assigned task.		
J W 13.6.04	Ethics	Demonstrate appropriate personal and professional attitudes and behaviors.		
J W 13.6.05	Ethics	Maintain a safe, clean, and organized work area.		
J W 13.6.06	Ethics	Demonstrate awareness of legal responsibilities related to individual performance, safety, and customer satisfaction.		
J W 13.6.07	Ethics	Demonstrate knowledge of various types of harassment.		
J W 13.7.01	Workplace	Develop a time schedule and prioritized task list to complete a job assignment.		
J W 13.7.02	Workplace	Identify the resources needed to complete a job assignment.		
J W 13.7.03	Workplace	Organize the material resources and space requirements needed to complete a job assignment.		
J W 13.7.04	Workplace	Effectively use technology to complete a job assignment.		
J W 13.7.05	Workplace	Demonstrate cooperation and leadership as a team at school or in a workplace setting.		
J W 13.7.06	Workplace	Use the basic components of effective time management.		
J W 13.7.07	Workplace	Recognize the need for management skills in the workplace with regard to stress, anger management, and substance abuse.		
J W 13.8.01	Career	Prepare a job application.		
J W 13.8.02	Career	Prepare a personal resume.		
J W 13.8.03	Career	Complete a personal aptitude and interest inventory.		
J W 13.8.04	Career	Participate in a mock job interview.		
J W 13.8.05	Career	Establish short-term career goals.		
J W 13.8.06	Career	Establish long-term career goals.		

Identifier	**Poplar - Journeyman - Welding**		Introduced	Completed
J W 13.8.07	Career	Use the Montana Career Information System (CIS) or a similar computer-based program to research careers in a chosen field.		
J W 13.8.08	Career	Participate in an organized job-shadowing activity.		
J W 13.8.09	Career	Participate in a community service project.		
J W 13.8.10	Career	Construct a career portfolio.		
J W 13.9.01	Retention	Maintain an employment/career portfolio.		
J W 13.9.02	Retention	Explain strategies for balancing work and family roles.		
J W 13.9.03	Retention	Demonstrate understanding of the need for lifelong learning in a rapidly changing job market.		
J W 13.9.04	Retention	Describe strategies to maintain employment in the face of job reductions.		
J W 13.9.05	Retention	Develop long-term career planning strategies.		
J W 13.9.06	Retention	Describe various educational options needed for job retention.		
J W 13.9.07	Retention	Model sound workplace ethics, such as loyalty, punctuality, and initiative.		
J W 13.9.08	Retention	Demonstrate interpersonal skills needed for job retention.		