

WELDING 2

26-27

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3:45 pm – 5:00 pm



Class Description:

Welding 2 is a full-year, two-period advanced welding course that builds on the safety, measurement, blueprint reading, fabrication, and Shielded Metal Arc Welding (SMAW) skills developed in Welding 1. The primary focus shifts to Flux Cored Arc Welding (FCAW), Gas Metal Arc Welding (GMAW (MIG)), and Gas Tungsten Arc Welding (GTAW (TIG)). Students are expected to work with greater independence, accuracy, efficiency, and responsibility while interpreting fabrication drawings, welding symbols, and Welding Procedure Specifications (WPSs); preparing and fitting materials; setting up equipment; verifying welding variables; and following professional safety and work practices.

Students begin the course with OSHA 10-Hour General Industry training through Vector Solutions. Topics include workplace hazards, personal protective equipment (PPE), emergency procedures, fire prevention, compressed gases, ventilation, Safety Data Sheets (SDSs), material handling, and other industrial safety practices related to welding and fabrication. Students who complete all required training and credential requirements may earn an OSHA 10-Hour General Industry credential.

The first major welding unit is Flux Cored Arc Welding (FCAW). Students inspect, set up, maintain, and safely operate equipment for both self-shielded Flux Cored Arc Welding (FCAW-S) and gas-shielded Flux Cored Arc Welding (FCAW-G). They learn how polarity, voltage, wire-feed speed, electrode extension, work and travel angles, travel speed, shielding gas, material preparation, and fit-up affect weld quality. Students complete surfacing, fillet-weld, and groove-weld assignments in flat, horizontal, vertical, and overhead positions while following assigned WPSs.

Students then advance to Gas Metal Arc Welding (GMAW (MIG)). They study welding power sources, wire feeders, welding guns, electrode wires, shielding gases, gas-flow rates, metal-transfer modes, equipment settings, and common welding variables. Students complete multiple-position welding assignments and apply blueprint reading, measurement, layout, cutting, material preparation, fit-up, tacking, welding, and inspection skills during a final multi-position fabrication project.

The course concludes with Gas Tungsten Arc Welding (GTAW (TIG)). Students learn equipment inspection and setup, torch components, torch control, filler-metal control, Tungsten (W) selection and preparation, Argon (Ar) shielding, gas-flow rates, current selection, polarity, and alternating-current and direct-current applications. Students perform GTAW (TIG) welds on mild steel, stainless steel, and Aluminum (Al) while learning how material identification, cleanliness, joint preparation, fit-up, heat input, and basic metallurgy affect weld quality.

Throughout the course, students inspect fit-up, tack welds, weld passes, and completed work using visual standards, measuring and inspection tools, scoring rubrics, technical vocabulary, and instructor feedback. They also develop employability skills by following work procedures, troubleshooting welding and fabrication problems, managing tools and materials, meeting deadlines, maintaining a safe and organized work area, communicating effectively, and demonstrating the professional habits expected in advanced technical education and entry-level industry settings.

Successful completion prepares students for Welding Internship, further technical education, industry credentials, and entry-level welding or fabrication work. When available, Welding 2 may also offer a dual-enrollment option through Coconino Community College for students who complete the required registration and meet college eligibility requirements.

The Sand Devil Way:

Sand Devil Way	What It Looks Like in This Class
Be Kind	Treat classmates, tools, equipment, materials, and the shop with respect, and support others in a safe and professional manner.
Get Involved	Participate, ask informed questions, solve problems, and contribute to demonstrations, fabrication work, and team responsibilities.
Work Hard	Use class time efficiently, work safely with increasing independence, follow Welding Procedure Specifications (WPSs), and produce accurate, high-quality work.

Classroom Culture: Our Social Contract and Behavior Process:

At Page High School, we believe that a positive, respectful learning environment is built collaboratively, not imposed. To support this, our classroom operates under two connected practices: a Social Contract and the Four Questions process.

This approach is part of a school-wide framework grounded in the belief that strong relationships are the foundation of learning and behavior. Students are far more likely to meet expectations they helped create, and to take accountability when they are guided through reflection rather than simply told what they did wrong. Parents and guardians can expect consistency in this process across classrooms at Page High School.

The Social Contract

At the start of the year, students and the teacher work together to define how we want to be treated and how we want to treat one another. This shared agreement — created *with* students rather than handed down *to* them — becomes the foundation for our classroom culture. Because students help write it, they take ownership of it, and it serves as our shared reference point throughout the year.

The 4 Questions

When a student's behavior does not align with our Social Contract, the teacher will not default to an immediate consequence. Instead, the teacher will guide the student through a brief, respectful conversation using four questions:

1. What are you doing?
2. What are you supposed to be doing?
3. Are you doing it?
4. What are you going to do about it?

This process is designed to build self-awareness and responsibility rather than compliance out of fear. It gives students the chance to reflect, take ownership of their choices, and identify their own path back to expected behavior — with the teacher's support. Consequences may still follow when necessary, but the goal is always growth and repair, not punishment alone.

Course Content:

1. OSHA 10-Hour General Industry safety and welding-specific hazard prevention
2. Advanced welding math, measurement, layout, blueprint reading, welding symbols, fit-up, thermal cutting for material preparation, and Welding Procedure Specifications (WPSs)
3. Self-shielded and gas-shielded Flux Cored Arc Welding (FCAW-S and FCAW-G) equipment, shielding, welding variables, and multiple-position welding
4. Gas Metal Arc Welding (GMAW (MIG)) equipment, electrode wires, shielding gases, metal-transfer modes, welding variables, and multiple-position welding and fabrication
5. Gas Tungsten Arc Welding (GTAW (TIG)) equipment, current and polarity, Tungsten (W), filler metals, Argon (Ar), and welding mild steel, stainless steel, and Aluminum (Al)
6. Weld quality, visual inspection, defect identification, troubleshooting, and quality control
7. Tool, equipment, material, and work-area management; fabrication planning and problem-solving; employability skills; and professional work habits

Learning Outcomes:

By the end of Welding 2, students will be able to:

1. Apply OSHA 10-Hour General Industry safety practices, select required personal protective equipment (PPE), and safely complete welding, cutting, grinding, compressed-gas, material-handling, and shop activities.
2. Apply welding math, measurement, layout, fabrication drawings, welding symbols, joint design, fit-up, material preparation, and Welding Procedure Specifications (WPSs) to advanced welding and fabrication work.
3. Inspect, set up, maintain, and operate wire-feeder welding equipment, welding guns, work leads, shielding-gas systems, and related accessories while adjusting welding variables to produce quality welds.
4. Complete self-shielded and gas-shielded Flux Cored Arc Welding (FCAW-S and FCAW-G) assignments in the required flat, horizontal, vertical, and overhead positions.
5. Select appropriate Gas Metal Arc Welding (GMAW (MIG)) electrode wires, shielding gases, metal-transfer modes, equipment settings, and techniques to complete multiple-position welding and fabrication assignments.
6. Set up and operate Gas Tungsten Arc Welding (GTAW (TIG)) equipment using the correct current, polarity, Tungsten (W), filler metal, and Argon (Ar), and complete assigned welds on mild steel, stainless steel, and Aluminum (Al).
7. Visually inspect welds for required size, placement, profile, visible fusion, defects, and discontinuities; identify likely causes of welding problems; and make appropriate adjustments to settings, technique, preparation, or fit-up.
8. Complete fabrication work accurately and professionally by planning assigned work, solving problems, managing tools and materials, maintaining an organized work area, meeting deadlines, communicating effectively, working with others, and caring responsibly for Welding Program property.

Student learning will be measured through OSHA safety training, written work, assessments, skill demonstrations, welding and fabrication assignments, weld inspections, scoring rubrics, and final evaluations. Successful completion prepares students for Welding Internship, further technical education, industry credentials, and entry-level welding or fabrication work.

Instructional Materials:

No textbook is required. The instructor will provide required printed and digital instructional materials, including OSHA 10-Hour General Industry training through Vector Solutions, Welding Procedure Specifications (WPSs), fabrication drawings, technical references, assignments, and safety resources. Students will use the class set of Chromebooks, school-approved platforms, and approved instructional media for OSHA coursework, welding-process instruction, demonstrations, fabrication planning, and career preparation.

Required Supplies, Shop Clothing, and PPE:

Students must have:

- Pen or pencil
- School-issued 3-ring binder
- Notebook paper, as needed
- Full-length denim jeans
- Closed-toe, closed-heel work boots
- Welding gloves
- Safety glasses rated Z87+

The Welding Program normally provides welding gloves and Z87+ safety glasses. Personal gloves or safety glasses must be approved by the welding instructor. Students needing help obtaining required shop clothing or personal protective equipment (PPE) should contact the welding instructor or the CTE office. Shop clothing may become dirty, burned, or damaged during advanced welding and fabrication activities.

Optional Personal or Upgraded Equipment:

The Welding Program provides the tools, equipment, materials, welding gloves, and safety glasses required for normal Welding 2 activities. Students are not required to purchase personal or upgraded equipment.

Students who prefer to use their own equipment may bring:

- Steel-toe or safety boots
- Upgraded welding gloves
- Auto-darkening welding helmet
- Welding jacket
- Personal Z87+ safety glasses
- Personal hearing protection
- NIOSH-approved N95 or P100 particulate respirator
- Construction calculator
- Welding cap

Personal equipment must be clearly labeled with the student's name, appropriate for the assigned welding or fabrication process, and inspected and approved by the welding instructor before use.

Arizona CTE Standards Alignment:

Welding 2 is aligned with the Arizona Welding Technologies 48.0508.00 Technical Standards, including:

Standard 1.0 — Maintain the Safety and Health of Welders

Standard 2.0 — Lay Out and Fit Up a Project from a Blueprint

Standard 4.0 — Set Up and Use Gas Metal Arc Welding (GMAW (MIG)) Equipment

Standard 5.0 — Set Up and Use Flux Cored Arc Welding (FCAW) Equipment

Standard 6.0 — Set Up and Use Gas Tungsten Arc Welding (GTAW (TIG)) Equipment

Standard 7.0 — Set Up and Use Thermal Cutting Equipment

Standard 8.0 — Perform Weldment Testing

Standard 9.0 — Use Auxiliary Equipment and Tools

Arizona Professional Skills are integrated throughout the course through communication, collaboration, critical thinking, problem-solving, professionalism, workplace safety, ethical behavior, and responsibility.

Complete standards: <https://www.azed.gov/cte/weld>

Absence Policy:

Absence Intervention Chart	
Absence Count = UNV + TRU + VER (Does not include EXC, ACT, ONC)	
1 - 3 Absences (in a class)	• SchoolMessenger will notify parent/guardian by phone/email for period and/or all-day absence. • Teacher will engage in a one-on-one check-in conversation with student about absences. • Student will obtain missing work from the content teacher per teacher's missing work/make-up policy and expectation.

4 - 5 Absences (in a class)	• 4-day Attendance Notification Letter (includes attendance print-out of record to date) will be sent home to parents/guardians, delivered to student. • Student will receive the opportunity to recover missed learning through after school intervention time in the accordance of the course plan for success.
6-7 Absences (in a class)	• 6-day Final Attendance Notification Letter (includes print-out of record to date) will be sent home to parents/guardians and delivered to student.
8 absences (in a class)	• 8-day attendance notification letter requiring an administrative conference will be sent to parents/guardians. • The student may be placed on an attendance contract and/or referred to a district attendance hearing to address the root cause of absenteeism. Documentation for absences need to be submitted by parent/guardian. • Student will be assigned to after-school tutoring to recover missed learning through after school intervention time in the accordance of the course plan for success.
9+ absences	• If a student continues to be chronically absent after all interventions have been implemented/exhausted, a follow-up conference with the Parent/Guardian, student and Assistant Principal/Designee will be held.
10 consecutive absences	• Student will be automatically withdrawn pursuant to ARS 15-901. Re-enrollment will require an administrative conference and attendance contract.

The following could be used for intervention/remediation due to excessive absences:

- After-school tutoring
 - Offered Monday, Tuesday, and Wednesday 3:50 - 5:15 pm
- Summer school
 - Offered the month of June each summer
- Additional academic courses in lieu of elective courses

In Welding 2, an absence may result in missed OSHA instruction, process-specific safety training, equipment demonstrations, or supervised welding and fabrication work that cannot be replaced by written work. Before using affected equipment or beginning the related FCAW, GMAW (MIG), GTAW (TIG), cutting, or fabrication activity, the student must complete the missed instruction and receive authorization from the welding instructor. Makeup shop work must be completed during an approved supervised time as staffing, equipment, materials, and course pacing allow.

Tardy Policy:

A student who is not in their assigned location when the bell rings at the end of class change is considered tardy. Students who are tardy should report directly to class; the teacher should administer the following consequences:

Tardies are disruptive to the learning environment. They break the momentum of learning in the classroom. Likewise, they often make the teacher stop and change the completed attendance. If you are tardy to class, it will be treated as a minor incident and following steps will be taken by both the teacher and the student:

Tardy Intervention Chart	
1 - 2 Tardies (in a class)	• Teacher records the tardy (include the tardy #), • Teacher communicates expectation to the student (re-teach) and utilizes classroom management procedures to reinforce expectation.

	• Teacher may call home. • Student assigned to lunch detention.
3-4 Tardies (in a class)	• Referral (tardy ODR) completed by teacher. • Student participates in a truancy round-up. • Student assigned to lunch detention.
5+ Tardies (in a class)	• Referral (tardy ODR) completed by the teacher. • Students assigned to lunch detention and/or After-School Detention (ASD) to make-up missing academics.
Excessive Tardies (15+ minutes)	• Student receives lunch detention. Any unexcused tardy over 30 minutes may be determined a truancy.
Habitual tardiness	• Students who are deemed habitually tardy despite interventions will then receive multiple days of lunch detention and/or after school detention. • Parent conference with administration.
<i>The tardy count starts at zero at the beginning of each semester.</i>	

In Welding 2, tardiness may affect a student's ability to participate when required safety instruction, equipment setup, Welding Procedure Specification (WPS) review, or part of a demonstration is missed. Before joining the affected activity or using the equipment, the student must complete the missed instruction and receive authorization from the welding instructor.

Late and Missing Work Policy:

Assignments, projects, quizzes, and assessments will have posted due dates. Eligible late work will receive the following adjustment after it is graded:

- **1–4 school days late:** 75% of the score earned
- **5 or more school days late:** 50% of the score earned

Work missed because of an approved absence will follow the makeup period provided by the current Page High School Student Handbook before a late adjustment applies. Work marked **Missing (MIS)** may still be completed within the applicable window; a numeric zero is final.

Final Completion Windows

- **Computer-based and written work:** Due by 12:00 p.m. on the final school day of the semester unless an earlier deadline is posted.
- **Lab and shop work:** Due by the end of the final instructional day of the week before finals week.
- **Quizzes:** Available for one calendar week unless a different closing date is posted.

Welding, cutting, grinding, equipment-operation, and fabrication assignments must be completed during class, office hours, or another approved supervised time. Makeup shop work must be arranged with the instructor and is subject to available staffing, equipment, materials, and course pacing. Work or quizzes not completed before the applicable closing deadline will no longer be accepted and will be recorded as a final zero. Approved accommodations and special circumstances will be handled according to school requirements.

Grades and assignment information are maintained in PowerSchool according to the current Page High School grading scale. Students and families should review PowerSchool regularly and contact the instructor with questions.

CTE Field Trip Eligibility:

Participation in CTE-sponsored field trips and travel is a privilege. To be eligible, students must have a grade of **70% or higher in every class**.

Grades will be checked in PowerSchool at **12:00 p.m. on the school day before the scheduled trip or departure**. A student with a grade below 70% in any class at that time will not be eligible to attend unless an exception is approved by school administration.

Students must also submit all required permission forms and travel documents by the stated deadlines and meet applicable Page High School and Page Unified School District behavior and travel expectations.

Welding CTSO events and competitions may have additional eligibility requirements established by the current Welding CTSO Constitution.

Acknowledgment of Risk and Safety Responsibilities:

Welding 2 includes advanced welding, cutting, grinding, fabrication, compressed-gas, and material-handling activities using FCAW, GMAW (MIG), GTAW (TIG), and related equipment. These activities involve recognized hazards that cannot be completely eliminated. Safety instruction, personal protective equipment (PPE), ventilation, equipment safeguards, supervision, and established procedures are used to reduce these risks.

Students must complete and follow the separate Welding Program Student Safety Agreement before participating in shop activities. Although Welding 2 students are expected to work with greater independence, they may use only the equipment, processes, materials, and settings for which they have received instruction and authorization. Students must follow safety directions and Welding Procedure Specifications (WPSs), verify equipment setup, and stop to ask for help when they are unsure or discover an unsafe condition. Failure to meet safety requirements may restrict shop participation and will be addressed according to the Safety Agreement and applicable school and district procedures.

Signing the Environmental Plan acknowledgment confirms receipt and review of this notice. It does not waive legal rights or replace requirements established by law, district policy, the Student Handbook, an approved student accommodation or health plan, or the separate Welding Program Student Safety Agreement.

Welding Locker Agreement:

Each student will be assigned a welding locker and a Welding Program combination lock. Students must use only their assigned locker and the program-issued or instructor-approved lock, keep the locker secured, and immediately report a damaged locker, missing or damaged lock, or compromised combination. A lost, missing, or damaged program-issued lock will result in a \$5 replacement fee.

Personal or unauthorized locks may not be placed on welding lockers and may be removed by authorized school personnel. Welding lockers remain school property and may be opened, inspected, or searched according to Page Unified School District policy and the current Page High School Student Handbook. Students are responsible for the contents of their assigned lockers and must report any item that does not belong to them.

Students must completely clean and empty their lockers, return Welding Program property and the program-issued lock, and remove all personal belongings by the announced deadline or when leaving the course. Items left behind will be handled according to current school or district procedures.

Welding Program Property:

Welding Program tools, equipment, personal protective equipment (PPE), materials, consumables, scrap, practice pieces, and projects remain school or district property unless the welding instructor authorizes their removal. Students must use program property only for approved work, follow all tool-tag, checkout, inventory, storage, and return procedures, use materials responsibly, and promptly report missing or damaged property.

Students may not take, hide, lend, trade, alter, damage, or remove Welding Program property without permission. Suspected theft, vandalism, unauthorized possession, or intentional damage will be addressed according to the current Page High School Student Handbook and Page Unified School District procedures.

No Cell Bell-to-Bell:

Negative Effects of Cellphone Use During Instructional Time

- Adolescents who use smartphones throughout the school day may spend about one-third of instructional time on their devices.
- Higher smartphone use during school is associated with reduced cognitive control.
- Students who have access to their cellphones during instructional time demonstrate lower attention and poorer recall of instructional material than students whose phones are removed.
- Simply having a cellphone available can reduce attention and memory.
- Learning can be impaired when attention is divided between instructional materials and distracting cellphone use.

Students will face the following consequences for violating cellphone expectations:

1st Offense: Staff will review the schoolwide expectation of no phones during instructional time, and the student will be directed to place the phone in the box.

2nd Offense: The phone will be confiscated and held by administration until the end of the day.

3rd Offense: The phone will be confiscated and held until the end of the day, the student will be assigned Lunch Detention, and the parent or guardian will be notified.

4th Offense: The phone will be confiscated, the student will be assigned After-School Detention (ASD), and a parent or guardian must pick up the phone.

5th Offense: The student will be required to turn the phone into the office upon arriving on campus each morning. The duration will be determined by administration.

A student found using a cellphone in the hallway during instructional time will have the device confiscated and held until the end of the day.

Additional shop-specific expectations for personal electronic devices will be addressed in the separate Welding Program Student Safety Agreement.

Dual Enrollment Requirement:

Welding 2 includes required dual enrollment through Coconino Community College (CCC). Students are expected to enroll in and complete **WLD 102 and WLD 106** as part of the Welding 2 course sequence. Dual enrollment is provided **at no cost to students enrolled in the Sand Devils Welding 2 program**, giving students the opportunity to earn college credit while completing their high school welding coursework.

The two CCC courses represent an **estimated value of approximately \$2,800 in college coursework**. Students are responsible for completing required CCC enrollment and registration steps and participating in the college coursework as directed. Questions or problems involving enrollment, registration, or course requirements should be brought to the welding instructor as soon as possible.

Welding 2 Environmental Plan Acknowledgment

2026–2027 School Year

Instructor: Samuel Rangel

Return and Process-Clearance Requirements:

Please complete, sign, and return this page by the posted deadline.

Students may continue completing approved classroom and OSHA assignments while required forms or safety requirements are outstanding. However, a student may not participate in welding lab/shop activities until:

This acknowledgment has been signed and returned.

The separate Welding Program Student Safety Agreement has been completed and returned with all required signatures.

Required initial safety instruction and assignments have been completed.

The student has earned 100% accuracy on each required safety quiz or test.

The welding instructor has granted initial shop clearance.

Initial shop clearance does not authorize every tool, machine, material, welding process, cutting process, or equipment setting used in Welding 2. Successful completion of Welding 1 also does not automatically authorize students to use Welding 2 equipment or processes.

Before beginning each new FCAW, GMAW (MIG), GTAW (TIG), cutting, grinding, or fabrication activity, students must complete the required process-specific instruction and demonstration, review the assigned Welding Procedure Specification (WPS), demonstrate proper equipment setup, and receive authorization from the welding instructor.

School and District Policy

This Environmental Plan was finalized before publication of the 2026–2027 Page High School Student Handbook and reflects the most current guidance available at that time. It remains subject to applicable law, Page Unified School District policy, the current Page High School Student Handbook, the PHS Academic Planning Guide, approved student accommodations or health plans, and the separate Welding Program Student Safety Agreement.

If any part of this Environmental Plan conflicts with a controlling requirement, the controlling requirement will take precedence. Course procedures may be updated when necessary, with reasonable notice provided to students and families.

Signing this acknowledgment confirms receipt and review of the Environmental Plan. It does not waive legal rights or replace any controlling legal, school, or district requirement.

Student Acknowledgment:

By signing below, I confirm that I have received and reviewed the Welding 2 Environmental Plan. I understand the course expectations, required supplies and personal protective equipment (PPE), attendance and tardy procedures, late-work requirements, cellphone expectations, locker requirements, and responsibilities for Welding Program property.

I understand that Welding 2 includes OSHA instruction and advanced FCAW, GMAW (MIG), GTAW (TIG), cutting, grinding, and fabrication activities. Although I will be expected to work with greater independence, I may use only the tools, equipment, processes, materials, and settings for which I have received instruction and authorization.

I agree to follow classroom and shop expectations, use required PPE, follow assigned Welding Procedure Specifications (WPSs), verify equipment setup, stop work when I notice an unsafe condition, and ask the welding instructor for help whenever I do not understand a direction, procedure, tool, machine, equipment setting, or assigned task.

Student name, printed: _____

Class periods: _____

Student signature: _____

Date: _____

Parent or Guardian Acknowledgment:

By signing below, I confirm that I have received and reviewed the Welding 2 Environmental Plan. I understand that Welding 2 is an advanced, two-period course combining classroom and OSHA 10-Hour General Industry instruction with supervised welding and fabrication activities involving FCAW, GMAW (MIG), GTAW (TIG), cutting and grinding equipment, compressed gases, electrical hazards, fumes, sparks, hot and sharp materials, and other recognized shop hazards.

I understand that prior welding experience and initial shop clearance do not automatically authorize the student to use every tool, machine, material, or process. Students must complete required safety instruction and receive process-specific authorization before participating in advanced shop activities.

I understand that additional safety requirements are provided in the separate Welding Program Student Safety Agreement. I may contact the welding instructor with questions about the course, safety requirements, the student's progress, or program expectations.

Parent or guardian name, printed: _____

Relationship to student: _____

Daytime phone number: _____

Email address: _____

Preferred communication method:

☐ Text message ☐ Email ☐ Phone call

Parent or guardian signature: _____

Date: _____