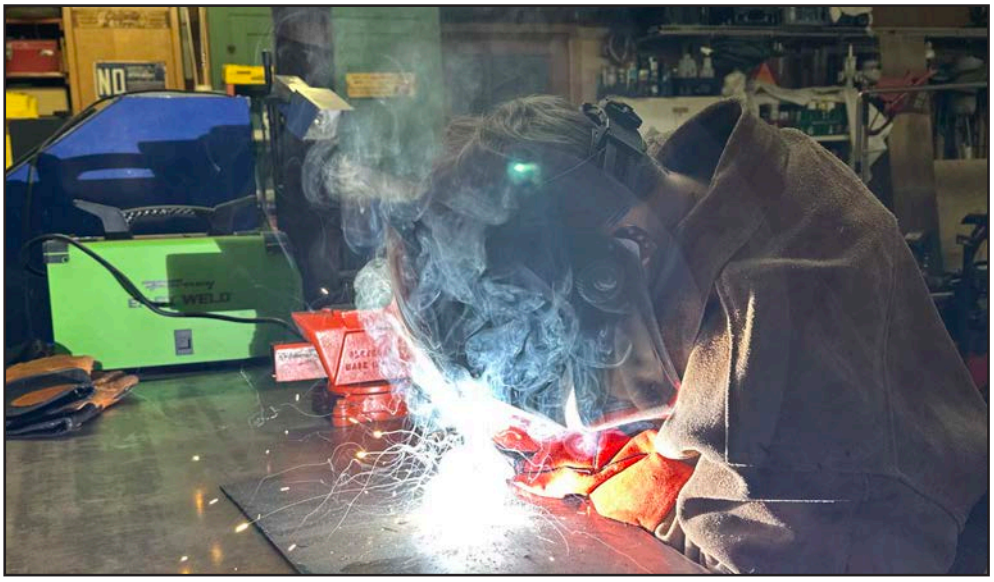
K-STATE Research and Extension

Explore Your Spark!

Ag Mechanics Welding



Take a quick look around your house, farm, or ranch for the number of ways metal is used. The Ag Mechanics Welding project helps youth become Beyond Ready by building practical skills in craftsmanship, problem-solving, and safety. Youth will learn how to join, repair, and fabricate metal using a variety of welding processes and techniques as a skill and an art. With safety as the top priority, youth will develop strong habits as they identify welding equipment, understand electrodes, and practice basic welding skills. Starting with foundational skills, youth will become confident, capable, and ready for future careers in agriculture, trades, and engineering.

Appropriate PPE (Personal Protective Equipment) is required during welding, cutting, grinding, and metal fabrication activities. This includes using a welding helmet with correct shade lens, safety glasses with side shields, welding gloves, flame-resistant long-sleeve shirt and pants, closed-toe leather boots, and hearing protection.

Starting Out *Beginner*:

- Personal and general shop safety.
- Learn different types of metals and welding processes.
- Learn basic Shielded Metal Arc Welding (SMAW) — "stick welding."
- Learn Oxyacetylene Cutting (OAC) - flat position.
- Processes used for fabrication and repair.

Learning More *Intermediate*:

- Continue with SMAW welding using different electrodes.
- Practice SMAW in "out of position" welds on basic welding joints.
- Introduce Gas Metal Arc Welding or "wire welding"
- Identify weld defects.
- Identify good weld bead characteristics.
- Practice basic metal preparation techniques (cutting, grinding, cleaning joints).

Expanding Horizons *Advanced*:

- Demonstrate basic welding technique mastery.
- Apply fabrication techniques to projects, repairs, and applications.
- Explore metallurgy concepts (heat-affected zones, material properties).
- Interpret blueprints and welding symbols.
- Identify causes of weld defects and make adjustments.

Beyond Ready

Ready to Lead

Youth involved in 4-H are **two times more likely to have the goal of becoming a leader.** Through real-world experiences and the guidance of caring mentors, they develop the confidence, communication, and decision-making skills needed to lead in today's changing world.

Ready to Serve

Youth who participate in 4-H are **three times more likely to engage in community service.** Service learning provides them with purpose and connection at a time when **more than 53% of Gen Z report feeling lonely.** Through 4-H, youth are empowered to serve with compassion and make a meaningful impact.

Ready to Build

With nearly **10 million unfilled jobs and 77% of employers seeking real-world skills,** 4-H helps youth build what matters. Through hands-on projects and career exploration, youth gain adaptability, problem-solving, and workforce readiness.

Ready to Conquer

While 52% of young people feel like they're failing at life goals, 4-H youth rise with resilience. Backed by research and supported by caring adults, they learn to overcome challenges, set goals, and take charge of their future with confidence.

Building a Ready Generation in a World of Change!

Ag Mechanics Welding

Expand Your Experiences!

Healthy Living:

- Demonstrate proper personal protective equipment (PPE) use.
- Create a clean, organized workspace promoting safety, efficiency, and well-being.
- Understand the importance of taking breaks, staying hydrated, and avoiding fatigue while working with equipment.
- Give a project talk on welding safety.

Science and Agriculture:

- Research how metals are refined from ore mined from the earth.
- Talk to a local welder about how they apply their craft on the farm or ranch.
- Learn about heat treatment and how it effects metals.
- Study the physics of electrical currents.

Community Vitality:

- Consider a community service project made of metal utilizing welding.
- Explore local chapters of professional organizations (American Welding Society).
- Volunteer to repair community equipment (picnic tables, benches, playgrounds, etc.).
- Create metal artwork for community events or donate to public spaces.

Communication and the Arts:

- Create a welding video of how to "run a bead," highlighting safety.
- Display welded artistic pieces at fairs, libraries, or community events.
- Develop a presentation describing the science behind welding.
- Create a step-by-step photo or video tutorial about welding techniques.

Career Exploration:

- Job shadow a Robotic Welding Technician.
- Visit a local welding or fabrication shop.
- Interview a professional welder.
- Visit a local technical college.
- Shadow a welding inspector.
- Research career paths in industrial technology precision machining or metal fabrication.
- Kansas Board of Regents Program Alignment — https://www.kansasregents.gov/workforce_development/program-alignment/welding
- Create a real/conceptual welding product or service business; participate in a YEC (Youth Entrepreneurship Challenge) competition.

Contact Information

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Resources & Events:

Access tools, expertise, and real-world experiences that strengthen your skills in Ag Mechanics Welding. Connect with professionals and participate in hands-on learning opportunities that help you grow your abilities and become Beyond Ready for future education, careers, and leadership roles.

- Club Day Presentations
- County Fair Exhibits
- Discovery Days
- K-State Open House

Curriculum & Resources:

- Contact your local Extension office.
- Go to Kansas 4-H Project Website — https://www.kansas4-h.org/projects/engineering-technology/ag-mechanics/
- Gas Welding Member Guide
- Gas Welding Leader Guide
- National Curriculum Arcs and Sparks: Shielded Metal Arc Welding
- Welding Safety American Welding Society (AWS) – Safety in Welding
- Supplemental Resources American Welding Society

4-H Record Keeping:

Learning to keep accurate records is a life skill.

- Setting 4-H Project Goals (4H1100), https://bookstore.ksre.ksu.edu/download/setting-4-h-project-goals_4H1100
- Kansas 4-H Record Keeping, https://www.kansas4-h.org/resources/awards-and-recognition/LocalRecordKeeping.html
- Complete a Welding journal:
  - »Welding processes used.
  - »Safety practices followed.
  - »Shop safety checks.
  - »Hours practicing welds.
  - »Weld settings used.

Project Exhibit Ideas:

- Assemble an educational welding display, notebook, or poster.
- Display different types of welds with different types of metal.
- Repair ag or non-ag equipment using welding techniques.
- Fabricate ag or non-ag equipment using welding techniques.
- Create an artistic sculpture or interpretive piece using welding techniques.

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