

Basic Welding		Grades 9-12	
Standards		Benchmarks	Activities/Examples
2. Students will develop an understanding of the core concepts of technology.	X	Systems, which are the building blocks of technology, are embedded within larger technological, social, and environmental systems.	Students learn how welding impacts other technologies, the economy, and the environment.
	Z	Selecting resources involves trade-offs between competing values, such as availability, cost, desirability, and waste.	Students need to select the appropriate metal to use on their projects weighing the trade-off between cost, strength, durability, weight, and appearance.
	BB	Optimization is an ongoing process or methodology of designing or making a product and is dependent on criteria and constraints.	Students build required projects that have specific criteria and directions, while considering material optimization.
	CC	New technologies create new processes.	Students learn how to use old and new welding processes and weigh pros and cons of each process.
	DD	Quality control is a planned process to ensure that a product, service, or system meets established criteria.	All of the students' projects and welds must meet the instructor's quality criteria to pass the course. Students also self-assess weld quality.
3. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.	J	Technological progress promotes the advancement of science and mathematics.	Welding is completely based on metallurgy which is the science and study of manipulating metal to meet specific purposes.
4. Students will develop an understanding of the cultural, social, economic, and political effects of technology.	I	Making decisions about the use of technology involves weighing the trade-offs between the positive and negative effects.	Students are required to complete projects in which they choose the best method of joining, cutting and drilling metal.
	K	The transfer of a technology from one society to another can cause cultural, social, economic, and political changes affecting both societies to varying degrees.	Oceanic (underwater) welding is described and its effects on the countries involved. The underwater welding may be for communications, pipelines, or oil drilling all of which become political concerns.
5. Students will develop an understanding of the effects of technology on the environment.	G	Humans can devise technologies to conserve water, soil, and energy through such techniques as reusing, reducing, and recycling.	Students are required to perform welds on new material. The welds are later either recycled or melted down. If melted down, students are to reshape and mold their reused material into desired shapes.
	H	When new technologies are developed to reduce the use of resources, considerations of trade-offs are important.	Students learn about the costs of several types of welding processes, some of which are very old. The old processes are compared to new welding processes and students must consider cost, speed, difficulty, and effectiveness when selecting the type of welder for each project.

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6. Students will develop an understanding of the role of society in the development and use of technology.	H	Different cultures develop their own technologies to satisfy their individual and shared needs, wants, and values.	The foundry lesson describes how different cultures have impacted and been impacted by the use of metal. It also describes what increases innovation such as war or religion. Welding technologies that were created to meet the demands of World War II are also discussed.
7. Students will develop an understanding of the influence of technology on history.	G	Most technological development has been evolutionary, the result of a series of refinements to a basic invention.	The welding processes that are learned all have commonalities in how they operate. These similarities are because the processes have been derived from one another through history.
	H	The evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials.	The foundry lesson teaches students how metal-work has impacted history as well as how historical events have affected metal-work.
	N	The Industrial Revolution saw the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time.	The foundry lesson teaches students how companies like John Deere became successful during the Industrial Revolution.
16. Students will develop an understanding of and be able to select and use energy and power technologies.	J	Energy cannot be created nor destroyed; however, it can be converted from one form to another.	Welding processes require heat which is a form of energy. Students use a variety of welders that require various forms of energy and convert them to heat through different methods.
19. Students will develop an understanding of and be able to select and use manufacturing technologies.			
	P	The interchangeability of parts increases the effectiveness of manufacturing processes.	Students are required to maintain and repair welding equipment. The parts and basic operation for the machines, though different by brand are commonly interchangeable thus making repairs more efficient.
20. Students will develop an understanding of and be able to select and use construction technologies.	K	Structures are constructed using a variety of processes and procedures.	The careers unit shows students the impact structural welding has on the construction field and how all contractors must collaborate.