Unit 4: Welding and Plasma Arc Cutting.

Content Area: **Industrial Technology**
Course(s): **Manufacturing Technology II**
Time Period: **2nd Marking Period**
Length: **40 Weeks**
Status: **Published**

Unit Overview

SWBAT safely operate Arc Welder, Metal Inert Gas Welder, Tungsten Inert Gas Welder, Oxy Acetylene Gas Welder and Cutting torch, Plasma Arc Cutting Torch. SWBAT aplly these skills to their projects. SWBAT identify careers available as a welder.

Transfer

Students will be able to independently use their learning to...

Apply the skills they have learned to their projects and how the skills they have learned can be applied to find a career in welding.

For more information, read the following article by Grant Wiggins.

http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60

Meaning

SWBAT Apply the skills they have learned to their projects and how the skills they have learned can be applied to find a career in welding.

Understandings

Students will understand that...

-What specifically do you want students to understand?

-What inferences should they make/grasp/realize?

Essential Questions

Students will keep considering...

Explain how Inert gas welding differs from arc welding?

What is the difference between inert gas welding and arc welding equipment?

What type of conditions are required to produce a sound weld?

How are gas welding rods classified?

Describe the basic weiding processes?

What are the basic parts of an oxyacetylene gas welding outfit?

What are the various types of weld joints?

How do you safely light, adjust oxyacetylene gas torch?

What is the difference between brazing and welding?

What is Shielded Metal arc welding process?

How do you select the proper welding rod for arc welding?

What type welding glass filter should be used for different type of welding?

What is harmful when arc welding?

How are solders classified?

Why is flux necessary?

How do you tin a soldering iron?

Describe the basic weiding processes?

What are the basic parts of an oxyacetylene gas welding outfit?

What are the various types of weld joints?

How do you safely light, adjust oxyacetylene gas torch?

What is the difference between brazing and welding?

What is Shielded Metal arc welding process?

How do you select the proper welding rod for arc welding?

What type welding glass filter should be used for different types of welding?

What is harmful when arc welding or TIG and MIG Welding?

What safety equipment should be worn when arc welding or TIG and MIG Welding?

Application of Knowledge and Skill

SWBAT apply their skills on their project and future career choice.

Students will know...

Students will know...

How to safely Arc Weld?

How to safely set up oxyacetylene welder to braze, weld and cut using torch and cutting torch.

How to select arc welding electrodes, arc welding current selection and weld assessment and weld projects.

How to select TIG welding rod, TIG welding current selection and weld assessment and weld projects

How to select MIG welding rod, MIG welding current selection and weld assessment and weld projects

How to set current selection for Plasma Arc Cutting Torch to cut materials for projects.

Students will be skilled at...

Students will be skilled at...

What discrete skills and processes should students be able to use?

Academic Vocabulary

Backhand welding, braze welding, brazing, capillary action, flux, forehand welding, fusion welding, gas weldin, oxyacetylene welding, weld pool, alternating current, arc welding, direct current, direct current electrode negative, direct current electrode positive, electrode, scratch method, shielded metal arc welding, stick welding, tap method, arc stud welding. electron beam welding. flux cored arc welding, gas metal arc welding, gas tungsten arc welding, laser beam welding, resistance welding, submerged arc welding, thermal welding, upset welding.

Learning Goal 1

SWBAT safely operate and Identify parts of Arc Welder. SWBAT safely arc weld the various joints and apply the skills to their project. SWBAT safely operate and Identify parts of the Metal Inert Gas Welder. SWBAT safely weld and operate Metal Inert Gas Weld a butt weld will be required out of mild steel and apply it to their projects. SWBAT safely weld and operate Tungsten Inert Gas Weld and weld an Aluminum butt weld out on Aluminum strips.

MANU.9-12.9.4.12.M.(1).2	Research new manufacturing processes to manage production of new and/or improved products.
MANU.9-12.9.4.12.M.(3).4	Demonstrate knowledge of the safe use of manufacturing equipment in order to ensure safety during maintenance, installation, and repair work.
MANU.9-12.9.4.12.M.(3).7	Create a preventive maintenance schedule to maintain manufacturing equipment, tools, and workstations.
MANU.9-12.9.4.12.M.(3).8	Describe predictive and preventive maintenance strategies used to ensure that production processes run smoothly.
MANU.9-12.9.4.12.M.(3).9	Identify and diagnose equipment problems in order to effectively repair manufacturing equipment.
MANU.9-12.9.4.12.M.(6).1	Evaluate procedures used to plan for safety in a new production process in order to ensure health, safety, and environmental well-being.
MANU.9-12.9.4.12.M.(6).2	Analyze investigations of health, safety, and/or environmental incidents and hazards in order to maintain healthy and safe manufacturing work environments.
MANU.9-12.9.4.12.M.(6).3	Evaluate preventive inspections of health, safety, and/or environmental hazards in order to ensure healthy and safe manufacturing work environments.
MANU.9-12.9.4.12.M.(6).4	Evaluate a job safety and health analysis of manufacturing jobs, equipment, and processes in order to identify priorities for health, safety, and environmental assurance programs.
MANU.9-12.9.4.12.M.(6).5	Analyze safety inspections findings and implement appropriate safety practices in order to improve the health and safety of manufacturing workplaces.

MANU.9-12.9.4.12.M.(6).6	Evaluate and summarize training in health, safety, and/or environmental issues needed to provide safe, healthy, and productive manufacturing work environments.
MANU.9-12.9.4.12.M.(6).10	Examine and summarize health, safety, and/or environmental quality assurance programs in order to ensure healthy and safe manufacturing work environments.
MANU.9-12.9.4.12.M.1	Demonstrate language arts knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.2	Demonstrate mathematics knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.3	Demonstrate science knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
MANU.9-12.9.4.12.M.4	Select and employ appropriate reading and communication strategies to learn and use technical concepts and vocabulary in practice.
MANU.9-12.9.4.12.M.5	Demonstrate use of the concepts, strategies, and systems for obtaining and conveying ideas and information to enhance communication.
MANU.9-12.9.4.12.M.6	Locate, organize, and reference written information from various sources to communicate with others.
MANU.9-12.9.4.12.M.7	Evaluate and use information resources to accomplish specific occupational tasks.
MANU.9-12.9.4.12.M.11	Apply active listening skills to obtain and clarify information.
MANU.9-12.9.4.12.M.16	Employ critical thinking and interpersonal skills to resolve.
MANU.9-12.9.4.12.M.18	Conduct technical research to gather information necessary for decision-making.
MANU.9-12.9.4.12.M.19	Employ technological tools to expedite workflow.
MANU.9-12.9.4.12.M.27	Employ computer operations applications to manage tasks.
MANU.9-12.9.4.12.M.33	Demonstrate knowledge of personal and jobsite safety rules and regulations to maintain safe and healthful working conditions and environments.
MANU.9-12.9.4.12.M.34	Demonstrate knowledge of employee rights and responsibilities and employers' obligations to maintain workplace safety and health.
MANU.9-12.9.4.12.M.35	Identify emergency procedures that are necessary to provide aid in workplace accidents.
MANU.9-12.9.4.12.M.37	Explain health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
MANU.9-12.9.4.12.M.39	Maintain safe and healthful working conditions and environments to ensure employee safety.
MANU.9-12.9.4.12.M.40	Understand employee rights and responsibilities and employers obligations concerning occupational safety and health.
MANU.9-12.9.4.12.M.41	Assess types and sources of workplace hazards common to manufacturing business environments in order to maintain safe working conditions.
MANU.9-12.9.4.12.M.43	Summarize safety, health, and environmental management systems to convey an understanding of how manufacturing businesses comply with governmental policies and procedures.
MANU.9-12.9.4.12.M.44	Employ leadership skills to accomplish goals and objectives.
MANU.9-12.9.4.12.M.54	Demonstrate skills related to seeking and applying for employment in a desired job.
MANU.9-12.9.4.12.M.56	Demonstrate skills in evaluating and comparing employment opportunities in order to accept employment positions that match career goals.
MANU.9-12.9.4.12.M.59	Examine requirements for career advancement to plan for continuing education and training.

Target 1

SWBAT safely operate the Arc welder to perform a butt weld for assessment. SWBAT apply this skills to projects they have selected to work on.

Target 2

SWBAT safely operate the Metal Inert Gas and Tungsten Inert Gas welder to perform a butt weld for assessment. SWBAT apply this skills to projects they have selected to work on.

Learning Goal 2

SWBAT safely operate and Identify parts of Plasma Arc Cutter for their project.

Target 1

SWBAT safely operate the Plasma Arc Cutting machine to cut sttel stock for assessment. SWBAT apply this skills to projects they have selected to work on.

Summative Assessment

Students will be able to pass a safety test on shop safety rules. Students must pass the test to work in the Manufacturing Lab on the welding and cutting machines.

21st Century Life and Careers

Select all applicable standards from the applicable standards

CAEP.9.2.12.C.1	Review career goals and determine steps necessary for attainment.
CAEP.9.2.12.C.2	Modify Personalized Student Learning Plans to support declared career goals.

CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
CAEP.9.2.12.C.4	Analyze how economic conditions and societal changes influence employment trends and future education.
CAEP.9.2.12.C.5	Research career opportunities in the United States and abroad that require knowledge of world languages and diverse cultures.
CAEP.9.2.12.C.6	Investigate entrepreneurship opportunities as options for career planning and identify the knowledge, skills, abilities, and resources required for owning and managing a business.

Formative Assessment and Performance Opportunities

Students will be observed to make sure they are following safety rules and wearing proper safety equipment by the instructor and other students. Students will be graded on project rubric and craftsmanship. Student will also be graded on assigned assessments for each type of weld required.

Accommodations/Modifications

Students that have become proficient in a certain type or all welding can work on overhead welds for more credit.

Unit Resources

You tube Videos on Arc Welding and TIG and MIG welding, Plasma Arc Techniques and Safety.

Modern Metalworking Instructor's Manual by John R. Walker

Modern Metalworking Textbook by John R. Walker

Modern Metalworking Workbook by John R. Walker

Safety Hand outs from NJ and PA. Safety Tests

Interdisciplinary Connections

MA.K-12.1	Make sense of problems and persevere in solving them.
LA.RST.11-12.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on

explanations in the text.