

Course: Transportation Technology

Unit of Instruction: Introduction to Welding

1. Major Course Skills/Units of Study:

Introduction to Welding

2. Situation or Problem:

Given teacher information from lecture, word, and materials supplied, produce the following:
For Transportation 1 -- Oxy Acetylene Welds -- 3- 4"x4" welding plates as follows: One with 6 beads across the metal without welding rod to specification, One with 6 beads across the metal with welding rod to specification, and One Lap weld using Brazing Rod.

For Transportation 2 – One Butt Weld welded on 2 sides with 100% penetration meeting specifications, One T Weld welded on 2 sides meeting specification, One 4"x4" welding plate with 6 beads meeting specifications on the Stick Arc Welder, and One 4"x4" welding plate with 6 beads meeting specification on the MIG Wire-feed Welder.

3. Project Description, Design Brief or Purpose:

The teacher will give information by lecture and powerpoint documentation. The Transportation 1 students will demonstrate knowledge of the tools by passing the Oral Safety Tests including the Oxy-Acetylene Welder, Plasma Cutter, Portable Grinder with 100% accuracy. The Transportation 2 students will demonstrate knowledge of the tools by passing the Oral Safety Tests including the Oxy-Acetylene Welder, Plasma Cutter, Portable Grinder, Arc Welder, and Wire Feed Welder with 100% accuracy.

This assignment gives the beginning student the essentials in learning the basic hand/eye coordination necessary to be a successful welder.

4. Performance Specifications, Guidelines or Rules:

All welds need to be completed showing a pattern that demonstrates correct speed, heat, and distance needed to meet the industrial standard for welding.

5. Specific Project Core Competencies:

- **Technical Skills – Basic Oxy-Acetylene welding, Arc Welding, Plasma Cutting, and Grinding Tool Use**
- **Academic Skills – Reading Safety Material and machine gauges.**
- **Employment-Related Skills – Basic Preparation to learn welding skills.**
- **Career Transition Skills – Measuring Skills, Concepts of Basic Safety and Hand/Eye coordination, Computer Application Skills, Basic Welding Theory.**

Transportation Technologies

Outline based on OSPI Model Curriculum Framework

Transportation Competencies

Standards DW-TT 1: Develop an understanding of The Designed World to select and use transportation technologies.

DW-TT1.1 Transportation plays a vital role in the operation of other technologies, such as manufacturing, construction, communications, health and safety, and agriculture.

DW-TT1.5 All Transportation Technology programs need to include appropriate tool skills, health and safety, the manipulation of related materials, and the

development of appropriate products (physically, digitally or virtually).

Standard DW-TT 2: Investigate career opportunities in the transportation industry, explore the impact of transportation on our society and identify a variety of transportation technologies.

DW-TT2.1 Identify occupations related to the transportation industry.

DW-TT2.2 State the differences between past and present methods of transportation technologies.

DW-TT2.3 Identify a variety of systems, methods and materials for building transportation technologies.

DW-TT2.4 Learn and use safe work habits and techniques.

Standard DW-TT 5: Investigate the nature and meaning of *vehicular systems*.

DW-TT5.5 Demonstrate an understanding of structure of a vehicle.

DW-TT5.6 Demonstrate an understanding of support of a vehicle.

Power and Energy Competencies

Standard DW-EPT 1: Develop an understanding of The Designed World to select and use energy and power technologies.

Standard DW-EPT 2: Investigate career opportunities in the energy industry, explore the impact of energy on our society, and identify a variety of energy technologies.

DW-EPT2.1 Identify occupations related to the energy industry.

DW-EPT2.2 State the differences between past and present methods of energy technologies.

DW-EPT2.3 Identify a variety of systems, methods and materials for building energy technologies.

Generic Technology Education Competencies

Standard DW-EPT 2: Investigate career opportunities in the energy industry, explore the impact of energy on our society, and identify a variety of energy technologies.

DW-EPT2.3 Identify a variety of systems, methods and materials for building energy technologies.

Standard DW-EPT 3: Identify and understand conversion and converters.

DW-EPT3.1 Identify and explain energy conversion using mechanical converters

Standard DW-EPT 4: Identify and understand energy and power transmission.

DW-EPT4.1 Identify and explain mechanical transmission of energy and power.

Standards & Competencies: Exploratory = pre-industry content standard

C = CORE Standards 1-7 (The Nature of Technology, Technology & Society)

Students will develop an understanding of The Nature of Technology. This includes acquiring knowledge of:

Standard 1: the characteristics and scope of technology.

In order to comprehend the scope of technology, students should learn that:

C1.3 Inventions and innovations in a specific area are generally driven by research to achieve a specific objective.

Standard 3: the relationships among technologies and the connections between technology

and other fields of study.

In order to appreciate the relationships among technologies, as well as other fields of study, students should learn that:

- C3.1 Technology transfer occurs when a new user applies an existing innovation developed for one purpose in a different function; all technical systems are interrelated.
- C3.2 Technological innovation often results when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields.
- C3.3 Technological ideas are sometimes protected through the patent process.
- C3.4 Technological progress promotes the understanding and relevance of science, mathematics, reading, writing and oral communications.

Standard 8: the attributes of design.

In order to recognize the attributes of design, students should learn that:

- DP8.1 Design problems are seldom presented in a clearly defined form; the best results are often based on the clarity of the design problem.
- DP8.2 The design needs to be continually checked and critiqued, and the ideas of the design must be redefined and improved; the best results are often achieved when the process is non-linear.
- DP8.3 Requirements of a design, such as criteria, constraints, and efficiency, sometimes compete with each other.

Standard 9: design process

In order to comprehend engineering design, students should learn that:

- DP9.1 Established design principles are used to evaluate existing designs, to collect data, and to guide the design process; Design principles are often rules of thumb rather than absolutes.
- DP9.2 The design process is influenced by personal characteristics, such as creativity, teamwork, resourcefulness, and the ability to visualize and think abstractly.
- DP9.3 A prototype is a working model used to test a design concept by making actual observations and necessary adjustments.
- DP9.4 The design process takes into account a number of factors, including safety, reliability, economic considerations, manufacturability, maintenance and repairs, and human factors engineering; the design process can't be complete without a prototype or virtual model.

Students will develop Abilities for a Technological World. This includes becoming able to:

Standard 11: apply the design process.

As a part of learning how to apply design processes, students should be able to:

- DP11.1 Identify the design problem to solve and decide whether or not to address it; differentiate between problems and solutions.
- DP11.2 Identify criteria and constraints and determine how these will affect the design process.
- DP11.3 Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product.
- DP11.4 Evaluate the design solution using conceptual, physical and mathematical models at various intervals of the design process in order to check for proper design and to note where areas of improvements are needed.
- DP11.5 Develop and produce a product or system using a design process.
- DP11.6 Evaluate final solutions and communicate observations, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models.

Standard 12: use and maintain technological products and systems.

As part of learning how to use and maintain technological products and systems, students should be able to:

- DP12.1 Document process and procedures and communicate them to different audiences using appropriate oral and written techniques; technical communications is critical to maintaining and operating a system.
- DP12.5 Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate.

6. Assessment:

Students will pass oral tool safety tests with 100% accuracy. Students will present their welds and determine if they meet industrial standards. (Teacher Assessment – width, length of puddle marks, holes in metal, depth of weld)

7. Supplies/Materials and Community Resources:

Powerpoint & Excel Computer programs, Metal, Oxy-Acetylene Welders, Arc Welders, Wire Feed Welders, Plasma Cutter, Portable and Stationary Grinders.