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| **TEXAS CTE LESSON PLAN**  [www.txcte.org](http://www.txcte.org) | |
| **Lesson Identification and TEKS Addressed** | |
| **Career Cluster** | Manufacturing |
| **Course Name** | Welding I |
| **Lesson/Unit Title** | Welding Box Project |
| **TEKS Student Expectations** | **130.363. (c) Knowledge and Skills**  (2) The student explores the employability characteristics of a successful worker in the global economy  (A) The student is expected to explore academic knowledge and skills required for postsecondary education  (B) The student is expected to identify employers' expectations to foster positive customer satisfaction  (C) The student is expected to demonstrate the professional standards required in the workplace such as interviewing skills, flexibility, willingness to learn new skills and acquire knowledge, self-discipline, self-worth, positive attitude, and integrity in a work situation  (D) The student is expected to evaluate personal career goals;  (E) communicate effectively with others in the workplace to clarify objectives  (F) The student is expected to demonstrate skills related to health and safety in the workplace as specified by appropriate governmental regulations  (3) The student applies academic skills to the requirements of welding.  (A) The student is expected to demonstrate effective communication skills with individuals from varied cultures such as fellow workers, management, and customers  (B) The student is expected to demonstrate mathematical skills to estimate costs  (C) The student is expected to demonstrate technical writing skills related to work orders  (D) The student is expected to apply accurate readings of measuring devices  (E) The student is expected to use appropriate tools to make accurate measurements  (F) The student is expected to compute measurements such as area, surface area, volume, and perimeter  (G) The student is expected to solve problems using whole numbers, fractions, mixed numbers, and decimals  (H) The student is expected to use various methods, including a calculator, to perform computations  (I) The student is expected to perform conversions between fractions and decimals  (J) The student is expected to perform conversions between standards units and metric units  (K) The student is expected to calculate and apply the functions of angles such as using the Pythagorean Theorem  (L) The student is expected to diagram the parts of a circle  (4) The student evaluates the function and application of the tools, equipment, technologies, and materials used in welding.  (B) The student is expected to identify and properly dispose of environmentally hazardous materials used in welding  (D) The student is expected to choose appropriate personal protective equipment  (5) The student understands welding joint design, symbols, and welds  (A) The student is expected to demonstrate knowledge of engineering drawings, charts, and diagrams  (B) The student is expected to interpret orthographic and isometric views of three-dimensional figures  (C) The student is expected to interpret engineering, drawings, charts, and diagrams  (D) The student is expected to analyze components of the welding symbol  (E) The student is expected to identify types of welding joints  (F) The student is expected to identify positions of welding  (G) The student is expected to identify types of welds such as fillet, groove, spot, plug, and flanged  (6) The student analyzes the concepts and intricacies of inspections and related codes  (A) The student is expected to explain weld inspection processes  (B) The student is expected to interpret welding codes. |
| **Basic Direct Teach Lesson**  (Includes Special Education Modifications/Accommodations and  one English Language Proficiency Standards (ELPS) Strategy) | |
| **Instructional Objectives** | **Performance Objective**  Upon completion of this assignment, the student will be able to complete a welding *Box Project* to match the criteria in the *Box Project Rubric*.  **Specific Objectives**   * Analyze an illustration * Create prints with correct symbols and scaled measurements * Construct a 5 X 3 divided metal box |
| **Rationale** | It is critical that students can demonstrate welding skills necessary to complete a project independently. |
| **Duration of Lesson** | It should take approximately five, 45-minute class periods. |
| **Word Wall/Key Vocabulary**  *(ELPS c1a,c,f; c2b; c3a,b,d; c4c; c5b) PDAS II(5)* | * **Print**-a copy of a drawing or a plan (previously referred to as “blueprint”). * **Template**- a shaped piece of metal, wood, plastic, or other material used as a pattern. |
| **Materials/Specialized Equipment Needed** | Materials Needed   * Metal for each student (see materials list) * Tools for each student * *Sample Box Print Views Handout* * *Corner/Box Project Materials List* * *Box Project Rubric*   Equipment Needed   * Shop equipment * Computer and projector |
| **Anticipatory Set**  (May include pre-assessment for prior knowledge) | **Say**   * Let’s say a shop foreman or your boss gives you a project and you should build an item within the guidelines given.   **Ask**   * What do you need to do to start the project? * What are the steps to complete this project? * What things must be considered before completion?   **Show**   * Example of a corner plate * *Box Project Rubric* |
| **Direct Instruction \*** | **Outline:**   1. Overview topics in *Modern Welding*    1. Views/orientation    2. Drawings made to scale    3. Title block    4. How to read measurements 2. Show an example of a corner plate 3. Show and discuss the Parts Template 4. Review *Sample Box Print Views* Handout 5. Do not pass put the *Parts Template* 6. Students write an analysis, or plan for the steps to complete the box project (guided practice) 7. Critical thinking exercise    1. Ask students to predict how to take the corners and create a divided box    2. Class discussion of ideas 8. Students draw the Parts Template (print) on paper 9. Obtain peer’s review to declare drawings have correct symbols, scaled measurements, and are accurate 10. Obtain peer’s signature and then the teacher’s signature 11. Students draw their own template (print) for a box 12. Teacher checks for accuracy 13. Reteach during redraws 14. Students construct a 5x3 divided metal box 15. Discuss Box Project Rubric 16. After successfully completing the prints, students are ready for materials to build the box 17. Cut pieces of metal for the box, or use pre-cut material provided by teacher 18. Compare box pieces to template for size accuracy 19. Build the corner and have teacher check for accuracy (independent practice) 20. When box is tacked, the student obtains the teacher’s signature 21. Reconstruct box if it is inaccurate 22. Once signature is obtained, student welds box together 23. Evaluation - Box Project Rubric   A. Print  B. Metal box  *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*  NONE |
| **Guided Practice \*** | Students will write an analysis, or plan for the steps they will take to complete the metal box project.  *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*  NONE |
| **Independent Practice/Laboratory Experience/Differentiated Activities \*** | Student will work on their metal box in the shop.  *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*  NONE |
| **Lesson Closure** | Teacher will ask students for specific questions about the project or guidelines. |
| **Summative/End of Lesson Assessment \*** | Student completes box and turns in for a grade based upon the *Box Project Rubric* given to the student at the beginning of the project.  *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*  NONE |
| **References/Resources/**  **Teacher Preparation** | **Instructional Aids**   * *Sample Box Print Views Handout* * *Corner/Box Project Materials List* * *Box Project Rubric*   **Reference**   * Althouse, A. D. & Turnquist, C.H. & Bowditch, W.A. & Bowditch, K.E. & Bowditch, M. A. (2012). *Modern* *Welding*. (11thEd.) Chapter 2. Tinley Park, IL: Goodheart-Willcox |
| **Additional Required Components** | |
| **English Language Proficiency Standards (ELPS) Strategies** |  |
| **College and Career Readiness Connection[[1]](#footnote-1)** |  |
| **Recommended Strategies** | |
| **Reading Strategies** |  |
| **Quotes** |  |
| **Multimedia/Visual Strategy**  **Presentation Slides + One Additional Technology Connection** |  |
| **Graphic Organizers/Handout** |  |
| **Writing Strategies**  **Journal Entries + 1 Additional Writing Strategy** |  |
| **Communication**  **90 Second Speech Topics** |  |
| **Other Essential Lesson Components** | |
| **Enrichment Activity**  (e.g., homework assignment) | Apply learning to future lessons and work/employment. |
| **Family/Community Connection** |  |
| **CTSO connection(s)** | SkillsUSA |
| **Service Learning Projects** |  |
| **Lesson Notes** |  |

1. Visit the Texas College and Career Readiness Standards at <http://www.thecb.state.tx.us/collegereadiness/CRS.pdf>, Texas Higher Education Coordinating Board (THECB), 2009. [↑](#footnote-ref-1)