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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** | Filling the Gap |
| **TEKS Student Expectations** | **130.363. (c) Knowledge and Skills**  (2) The student explores the employability characteristics of a successful worker in the global economy. The student is expected to:  (A) explore academic knowledge and skills required for postsecondary education  (B) identify employers' expectations to foster positive customer satisfaction;  (C) 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) evaluate personal career goals  (E) communicate effectively with others in the workplace to clarify objectives  (F) 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.  The student is expected to:  (A) demonstrate effective communication skills with individuals from varied cultures such as fellow workers, management, and customers  (B) demonstrate mathematical skills to estimate costs  (C) demonstrate technical writing skills related to work orders  (D) apply accurate readings of measuring devices  (E) use appropriate tools to make accurate measurements  (F) compute measurements such as area, surface area, volume, and perimeter  (G) solve problems using whole numbers, fractions, mixed numbers, and decimals  (H) use various methods, including a calculator, to perform computations  (I) perform conversions between fractions and decimals  (4) The student evaluates the function and application of the tools, equipment, technologies, and materials used in welding.  The student is expected to:  (A) operate welding equipment according to safety standards  (5) The student understands welding joint design, symbols, and welds.  The student is expected to:  (E) identify types of welding joints  (F) identify positions of welding  (6) The student analyzes the concepts and intricacies of inspections and related codes.  The student is expected to:  (A) explain weld inspection processes  (B) 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 successfully fill the end of a 1-inch piece of square tubing with an arc weld.   [Lesson length is subjective and will vary from instructor to instructor]  **Specific Objectives:**   * Identify all materials needed for this exercise * Identify all safety procedures needed * Demonstrate the ability to fill the end of 1’ piece of square tubing * Utilize an angle grinder to smooth the welds * Demonstrate the integrity of the welds by filling the remaining end of tuning with water |
| **Rationale** | It is critical that students are able to fill gaps with an arc weld. |
| **Duration of Lesson** | 3 days |
| **Word Wall/Key Vocabulary**  *(ELPS c1a,c,f; c2b; c3a,b,d; c4c; c5b) PDAS II(5)* |  |
| **Materials/Specialized Equipment Needed** | Equipment:   * Chop-saw * Arc-welder * 6011 welding rods * Gloves * Welding hood * Angle grinder   Materials   * 6-inch piece of 1-inch square tubing   Instructional Aids   * Filling the Gap Outline * Quiz |
| **Anticipatory Set**  (May include pre-assessment for prior knowledge) | Any welder can weld a bead. Sometimes a bead is not all that is needed. It never fails, no matter how good you are, there is always a gap/hole that will need to be filled. *Now Lead into the lesson*. (Some students will have a harder time with this lesson than others). |
| **Direct Instruction \*** | 1. Each student need to have a refresher on safety   procedures involving welding and grinding   1. Have each student cut 6 inches off a stick of 1-inch square tubing 2. Have the students weld flat beads (on top of each other) until the gap is filled 3. Grind the welds flush with the end of the tubing 4. Add water at the open end to test for integrity   The following steps should be completed  Step 1   * Pick end of the tubing * Weld a small bead across the width of the tubing * Care should be taken not to burn through the wall of the tubing   Step 2:   * Weld an overlapping bead across the original pass * Repeat this process until the gap is completely enclosed   Step 3:   * Grind off the weld flush with the end of the tubing   Step 4:   * Add water to the open end of your piece of tubing * Watch for water penetrating through the welding end * If water is visible, repeat the process   *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 \*** | Teacher works through problems/activity as students observe/follow along and record process/solution and/or take notes.  *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 \*** | Students work independently or collaboratively (pairs, small groups, large groups, teams, etc.) to complete a new assignment similar to the guided practice assignment and related to the lesson objective.  *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** | * Ask specific questions of learners (be sure to list the questions to be asked and provide the correct/desired answers). * Ask learners if they have any questions * Have each student state one fact s/he learned during the lesson * Restate lesson objectives or have students recall lesson objectives |
| **Summative/End of Lesson Assessment \*** | Demonstration of process or experiment – be sure to include printed directions for students as well as an evaluation checklist to be used to evaluate the demonstration.  *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** |  |
| **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) | Suggest ways student learning from thelesson can be extended individually in new or novel situations.   * Applying learning/content to personal life (work or home) or other classes (academic or elective). * Applying learning to future lessons/coursework. |
| **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

   HECB), 2009. [↑](#footnote-ref-1)