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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** | Principles of Manufacturing |
| **Lesson/Unit Title** | Mass Production in Manufacturing |
| **TEKS Student Expectations** | **130.352. (c) Knowledge and Skills**  (2) The student applies manufacturing concepts to specific problems  (A) The student is expected to distinguish between disciplines such as engineering, science, manufacturing, and technology  (B) The student is expected to use tools such as calculators and computers to solve problems  (5) The student practices safe work habits  (A) The student is expected to master relevant safety tests based on OSHA guidelines and principles and  (B) The student is expected to use Material Safety Data Sheets (MSDS) to analyze, store, and safely dispose of hazardous materials |
| **Basic Direct Teach Lesson**  (Includes Special Education Modifications/Accommodations and  one English Language Proficiency Standards (ELPS) Strategy) | |
| **Instructional Objectives** | The students will be able to:   * List types of mass production. * Explore techniques of mass production by creating a paper towel holder project. * Inspect the quality of a paper towel holder. |
| **Rationale** | Mass production greatly increase the efficiency of manufacturing. The students will be able to create a paper towel holder using mass production techniques. |
| **Duration of Lesson** | Teacher’s discretion |
| **Word Wall/Key Vocabulary**  *(ELPS c1a,c,f; c2b; c3a,b,d; c4c; c5b) PDAS II(5)* | * Manufacturing * Mass Production * Jig * Sander Base * Drill Press * Radial Arm Saw * Miter * Router * Band Saw * “C” Clamp * Dowel |
| **Materials/Specialized Equipment Needed** | Instructional Aids:   * “Mass Production in Manufacturing” PowerPoint presentation * Handouts   Materials Needed:   * Pen or pencil * Wood * Dowel rods * Rubber bumpers/felt pads * Glue * Wood screw * Finish materials   Equipment Needed:   * Computer * Data projector * Machines for project |
| **Anticipatory Set**  (May include pre-assessment for prior knowledge) | Learner Preparation:  Completion of the following manufacturing lessons: Safety tests, First Project: A Sign, Finishing Touches. View “Manufacturing Companies” lesson if necessary.  Introduction:  **SAY**: Today we are going to learn about mass production in manufacturing.  **ASK**: What do you think are the benefits of doing just one part of the project?  **SAY**: Please discuss briefly.  **ASK**: Are there any negatives to doing just one part of the project? If so, what are they?  **SAY**: Please discuss briefly.  **ASK**: What do you think would happen to the production if someone did not complete their part in a timely manner?  **SAY**: Please discuss briefly.  **SAY**: The next couple of days will be spent using mass production techniques to complete a paper towel holder.  **SHOW**: Paper towel holder.  **SAY**: Here is an example of the project that you will be building.  **SAY**: You will be assigned the part of the project that you will be responsible for. |
| **Direct Instruction \*** | TEACHER NOTE: Instructors can use the PowerPoint presentation, slides, handouts, and note pages in conjunction with the following outline.  I. Introduction – Explain the different types of manufacturing. Talk to class about U.S. patents. View some of the links from the patent office.  A. Title slide (slide 1)  B. Types of manufacturing (slides 2-7)  C. Patents (slides 8 -9)  II.Texas Paper Towel Holder mass production project - (Slides 10) The teacher will explain the planning of the paper towel holder using the drawings on the slides and in the teacher’s guide.  A. Plan (slide 11)  B. Jigs for production (slide 12)  C. Exploded view with parts’ names (slide 13)  D. Bill of Material for one holder (slide 14)  III. Steps in mass production - The teacher will show the templates and jigs needed for production of the older. The teacher will show the finished holder.  A. Steps in making the Texas base (slide s15-16)  B. Steps in making the Post (slide 17)  C. Steps in making the Tear Bar (slide 18)  D. Steps in making the Cap (slide 19)  E. Steps in assembling the holder (slide 20)  IV. Resources (slide 20) - View some of the different videos on “How It’s Made” website and watch the V.W. plant video. Explain how companies produce products.  V. Create paper towel holders as a mass production project - Quality control will be used on each part using the Quality Control Check Sheet which is the formal evaluation of the completed project. Each student will complete the Quality Control Check Sheet for one or more paper towel holders. The teacher will set the number of paper towel holders to be produced during the production run. The teacher may want to make one for each student in class and have the students purchase them when finished. The class could choose to build a number to sell as a fundraising project. The students will each do an assigned step from the “Steps in Mass Productions” (slides 15-20).    *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 \*** | The teacher must explain the Mass Production in Manufacturing PowerPoint presentation and demonstrate the use of the jigs and fixtures.  *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 should be monitored while they are completing this project. After completing the paper towel holders, each student will complete the Quality Control Check Sheet for one or more paper towel holders.  *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** | Question: What have you learned about mass production?  Answer: Allow the students to explain their thoughts.  Question: Have you changed your mind about the pros and cons of doing just one part of the project?  Answer: Allow various students to answer.  Question: How do you think the mass production process could be made better?  Answer: Allow several students to answer. |
| **Summative/End of Lesson Assessment \*** | The formal assessment will be the evaluation of the completed project. Quality control will be used on each part using the “Quality Control Check Sheet.”  *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** | * Patents: * <http://www.uspto.gov/patents/process/index.jsp> * <http://www.inventnow.org/> * <http://www.uspto.gov/web/offices/ac/ahrpa/opa/kids/kid_tm_curriculum.html> * How it’s Made videos found at:  <http://science.discovery.com/videos/how-its-made/> * New VW Car Factory in Dresden, Germany found at: <http://www.youtube.com/embed/nd5WGLWNllA?rel=0> |
| **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) |  |
| **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)