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| **TEXAS CTE LESSON PLAN**  [www.txcte.org](http://www.txcte.org) | |
| **Lesson Identification and TEKS Addressed** | |
| **Career Cluster** | Science, Technology, Engineering & Mathematics |
| **Course Name** | AC/DC Electronics |
| **Lesson/Unit Title** | Hand tools |
| **TEKS Student Expectations** | **130.405. (c) Knowledge and Skills**  (5) The student practices safe and proper work habits. The student is expected to:  (A) master relevant safety tests  (B) comply with safety guidelines as described in various manuals, instructions, and regulations  (D) identify and classify hazardous materials according to Occupational Safety and Health Administration (OSHA) regulations and industry standards  (F) perform maintenance on selected tools, equipment, and machines  (G) handle and store tools and materials correctly and  (H) describe the results of improper maintenance of material, tools, and equipment |
| **Basic Direct Teach Lesson**  (Includes Special Education Modifications/Accommodations and  one English Language Proficiency Standards (ELPS) Strategy) | |
| **Instructional Objectives** | * Identify basic hand tools * Match tools to their uses * List factors to consider when selecting tools * List maintenance procedures for tools * Demonstrate the ability to:   + clean and lubricate pliers and   + adjust wire strippers. |
| **Rationale** | To work in AC/DC Electronics, students must be able to safely use and maintain electrical hand tools. Upon completion of this assignment, the student will be able to identify basic hand tools and list maintenance procedures for tools. |
| **Duration of Lesson** | Teacher’s Discrection |
| **Word Wall/Key Vocabulary**  *(ELPS c1a, c, f; c2b; c3a, b, d; c4c; c5b) PDAS II (5)* |  |
| **Materials/Specialized Equipment Needed** | **Instructional Aids**   * Hand Tools Lab #1 - Clean and Lubricate Pliers handout * Hand Tools Lab #2 - Adjust Wire Strippers handout * Hand Tools Exam I * Hand Tools Exam I Answer Key * Hand Tools Exam II * Hand Tools Exam II Answer Key   **Materials Needed**   * Pencil and paper * Assortment of tools * Cleaning material * Lubricant   **Equipment Needed**   * Computer and software * Projector and screen * Whiteboard * Breadboards and leads * Power supplies * Multimeters * Calculator |
| **Anticipatory Set**  (May include pre-assessment for prior knowledge) | The teacher may want to have students take notes on the material. |
| **Direct Instruction \*** | I. Overview (The teacher will make a PowerPoint slide presentation, if necessary.)  A. Tool hazards  B. Tool use responsibilities  II. Types of tools and their uses - (The teacher discusses tools and their uses. Make sure to review the tools and their uses that are covered in Exam I and Exam II. Examples used are typical for a lab. Your lab may or may not have these specific tools.)  A. Pliers   * Long nose pliers * Diagonal side cutting pliers   B. Screwdrivers   * Lineman’s side cutting pliers * Combination slip joint pliers * Flat head screwdriver * Phillips head screwdriver   C. Saws   * Hacksaw * Keyhole saws   D. 6-in-1 tool  E. Adjustable wire strippers  F. Wrenches   * Crescent wrench * Hex wrench * Socket wrench   G. Claw hammer  H. Nut driver  I. Wire gauge  J. Hemostat clamps  K. Drill and drill bits  L. Ball peen hammer  M. Flat files  N. Punches  III. Digital multimeter – (The teacher should search the Internet and other resources for information on multimeter safety.)  A. Uses and safety  B. Tests   * Voltage test * Resistance test * Current test   IV. Factors to consider when selecting tools – (The teacher discusses factors to consider when selecting tools.)  A. Size  B. Quality  C. Design  D. Specifications  V. Tool maintenance and safety  A. Screwdrivers  B. Pliers  C. Adjustable wrenches  D. All tools  VI. Summary  VII. Teacher demonstrations – (The teacher will distribute Hand Tools Lab #1 handout and Hand Tools Lab #2 handout to each student. The teacher will demonstrate how to clean and lubricate pliers (Lab #1) and adjust wire strippers (Lab #2). The students will replicate the activities in Lab #1 and Lab #2 handouts.)  A. Clean and adjust tools  B. Lubricate tools  C. Inspect tools  D. Discard malfunctioned tools  *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 students will observe, ask questions, and analyze the demonstration to be presented by the teacher. The teacher will use materials as listed in the lab activities to instruct students how to maintain hand tools.  *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 \*** | The students will replicate the lab activities.  *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 (as you hold up various tools)   What is the name and function of this tool?   * Ask   What are four factors that need to be considered when selecting a tool?   * Ask   What is the maintenance procedure for each of the following tools?   * + Screwdrivers   + Pliers   + Adjustable wrenches   + All tools   *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*  none |
| **Summative/End of Lesson Assessment \*** | **Informal Assessment:**  The teacher will monitor each student or small group as they individually work to complete the Lab #1 and Lab #2 assignments.  **Formal Assessment:**  1. The students will be assessed by participation in and completion of the lab activities.  2. The students will be assessed by taking the hand tools exams.  *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** | * Buchla, D., & Floyd, T. (2005). *The Science of Electronics DC/AC* (chapter 4). Upper Saddle River, NJ: Prentice Hall. * Floyd, T. (1993). *Principles of Electric Circuits: Electron Flow Version*, Don Mills, Ontario: Macmillan Publishing Co. * Robertson, L. (1980). *Basics Electronics I*. Stillwater, OK: Mid-American Vocational Curriculum Consortium, Inc. |
| **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) | In small groups, students may discuss the following topics.  • Knowing electricians' tools and their uses is a vital part of the industry and skills development.  • Thinking through a problem to arrive at the answer and the persistency to work past your frustrations tempers your character.  • There are points in the lab experience where a student may use leadership skills. Leading or following creates a sense of accomplishment that adds to the character of those students involved. Cognitive and leadership skills or development go hand and hand in surviving life’s road. |
| **Family/Community Connection** |  |
| **CTSO connection(s)** | SkillsUSA, Technology Student Association (TSA) |
| **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)