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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** | Sources of Electrical Energy |
| **TEKS Student Expectations** | **130.405. (c) Knowledge and Skills**(5) The student practices safe and proper work habits.(B) The student is expected to comply with safety guidelines as described in various manuals, instructions, and regulations(7) The student develops an understanding of basic alternating current (AC) electricity principles.(A) The student is expected to describe AC and give examples of its application and generation(8) The student implements the concepts and skills that form the technical knowledge of electronics using project-based assessments. (C) The student is expected to demonstrate an understanding of magnetism and induction as they relate to electronic circuits(9) The student applies the concepts and skills to simulated and actual work situations.(B) The student is expected to apply electrical theory to generators, electric motors, and transformers (C) The student applies the concepts and skills to simulated and actual work situations. The student is expected to design analog circuits using common components |
| **Basic Direct Teach Lesson**(Includes Special Education Modifications/Accommodations and one English Language Proficiency Standards (ELPS) Strategy) |
| **Instructional Objectives** | * Match the terms associated with sources of electrical energy to the correct definitions
* Match six major sources of electricity to the proper basic action
* Match energy sources to devices that transform them into electrical energy
* Demonstrate the ability to use and test batteries
* Generate electricity with magnetism
* Generate electricity with pressure
* Generate electricity with heat
* Generate electricity with light
* List the major parts of an electrical generation power plant
* Describe some of the features and principles involved in each step of electricity generation
 |
| **Rationale** | Workers in electronics should understand two aspects of electrical generation: the principles involved in electricity generation through energy transformation processes and the major sources and mechanisms involved in electricity generation for large-scale energy use. |
| **Duration of Lesson** | Teacher’s Discretion |
| **Word Wall/Key Vocabulary***(ELPS c1a,c,f; c2b; c3a,b,d; c4c; c5b) PDAS II(5)* | VoltageEnergy conversionInfrastructureNuclear powerHydraulicTurbine |
| **Materials/Specialized Equipment Needed** | * Sources of Electrical Energy Lab #1 – Use and Test Batteries
* Sources of Electrical Energy Lab #2 – Generate Electricity with Magnetism
* Sources of Electrical Energy Lab #3 – Generate Electricity with Pressure
* Sources of Electrical Energy Lab #4 – Generate Electricity with Heat
* Sources of Electrical Energy Lab #5 – Generate Electricity with Light
* Sources of Electrical Energy Exam
* Sources of Electrical Energy Exam Key
* Sources of Electrical Energy Quiz
* Sources of Electrical Energy Quiz Key

**Materials Needed*** Pencil and paper
* Galvanometer or voltmeter
* Dry erase makers
* Bar magnets
* Phonograph crystal
* Assorted dry cell and automotive batteries and lamps
* Hydrometer
* Iron and copper wire
* Compass

**Equipment Needed*** Computer and software
* Projector and screen
* Whiteboard
* Breadboards and leads
* Power supplies
* Multimeters
* Calculator
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| **Anticipatory Set**(May include pre-assessment for prior knowledge) |  |
| **Direct Instruction \*** |  |
| **Guided Practice \*** | The students will observe, ask questions, and analyze the demonstration presented by the teacher. The teacher will use materials as listed in the lab activities to instruct how to read, measure, and record data as needed.*Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*NONE |
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| **Independent Practice/Laboratory Experience/Differentiated Activities \*** | The student will try to replicate the lab activities, answer the discussion questions at the end of each lab, and turn sheets in for evaluation.*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** | The teacher will review the information on the exam and the quiz with the students. |
| **Summative/End of Lesson Assessment \***  | **Informal Assessment (LSI Quadrant III)**The teacher will monitor each student or small group as they work to complete the assignments. If re-teach is needed on any information or procedure, all those involved will stop and participate in the re-teach.**Formal Assessment (LSI Quadrant III, IV)**The student will be assessed by the accuracy of the completed assignments. The teacher will divide the final assessment into two parts; one part will be a formal exam and the other will be a measurement test of a series of exercises using the current, breadboards, power supplies, and assorted loads or lamps to measure current accurately.*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** | **References*** Buchla, D. and Floyd, T. (2005). *The science of electronics: DC/AC*. (chapter 4) Upper
* Saddle River, NJ: Prentice Hall.
* Floyd, T. L. (1993). *Principles of electric circuits: electron flow version*. Don Mills, Ontario: Macmillan Publishing Co.
* Robertson, L. P. (1980). *Basics electronics 1*. Stillwater, OK: Mid-American Vocational Curriculum Consortium, Inc.
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| **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, TSI |
| **Service Learning Projects** |  |
| **Lesson Notes** |  |
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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)