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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, and Mathematics |
| **Course Name** | Principles of Applied Engineering |
| **Lesson/Unit Title** | Green Energy Careers |
| **TEKS Student Expectations** | **§130.402. (c) Knowledge and Skills.**  (8) The student understands the opportunities and careers in fields related to electrical and mechanical systems.  (B) The student is expected to describe career opportunities in electrical and mechanical system |
| **Basic Direct Teach Lesson**  (Includes Special Education Modifications/Accommodations and  one English Language Proficiency Standards (ELPS) Strategy) | |
| **Instructional Objectives** | The student will be able to:   * Describe opportunities and careers they have studied in fields related to physical and mechanical systems; and relate them to green energy careers. * Compare renewable and non-renewable energy sources. * Research and create a presentation about a green energy career that they are interested in pursuing. * Identify a snapshot of jobs that are a fit for them by completing the career-planning quiz. |
| **Rationale** | Students will be able to compare renewable and non-renewable energy sources. They will also demonstrate they know how to research information and create a presentation about a green energy career they are interested in pursuing by completing the Assignment: What is in a Career? and accompanying rubric. |
| **Duration of Lesson** | Teacher’s Discretion |
| **Word Wall/Key Vocabulary**  *(ELPS c1a,c,f; c2b; c3a,b,d; c4c; c5b) PDAS II(5)* | **Career** – An occupation or profession, especially one requiring special training, followed as one's lifework: He sought a career as an engineer.  **Energy** - Is the capability of a physical system to perform work. It exists in several forms such as heat, kinetic or mechanical energy, light, potential energy, electrical or other forms.  **Biomass Energy** - Is a renewable energy source. It is organic material made from plants and animals; contains stored energy from the sun.  **Geothermal Energy** - Is a renewable energy source. Is heat from within the Earth. The word geothermal comes from the Greek words geo (earth) and therme (heat).  **HydroPower Energy** - Is a renewable energy source that produces the most electricity in the United States and accounts for 6% of total U.S. electricity generation and 67% of generation from renewables in 2008.  **Petroleum Energy** - Is a non-renewable energy source. It is gasoline, diesel fuel, and propane. Most gasoline is made from crude oil, formed from remains of plants and animals (diatoms) that lived hundreds of millions of years ago. Diesel fuel is used in diesel engines found in most freight trucks, trains, buses, boats, and farm and construction vehicles. Propane is an energy-rich gas that is found mixed with natural gas and oil.  **Solar Energ**y - Is a renewable energy source. It is the sun’s rays (solar radiation) that reach the Earth. It may be converted into other forms of energy, such as heat and electricity.  **Wind Energy** - Is renewable energy from the wind caused by moving air masses. The movement is caused by temperature and pressure differences in the atmosphere, which are tied to the non-uniform distribution of solar heat. |
| **Materials/Specialized Equipment Needed** | * Pen/Pencil * Technical Terms and Definitions handout for each student * Finding the Right Career for You handout for each student * What is in a Career? handout for each student * What is in a Career? rubric for each student * Computers with Internet access, Microsoft PowerPoint and Word * Video screen projector |
| **Anticipatory Set**  (May include pre-assessment for prior knowledge) | Students must understand the opportunities and careers in fields related to physical and mechanical systems. Students must select a green energy career in the fields related to physical and mechanical systems. |
| **Direct Instruction \*** | Introduction (LSI Quadrant I):  SAY: A career is an occupation or profession, especially one requiring special training, followed as one's lifework: She sought a career as an engineer.  ASK: What is your career interest/occupation or profession?  SAY: In this lesson, you will explore career opportunities in the Green Energy careers.  ASK: Can anyone name a renewable or non-renewable energy source.  Outline:  Instructors are recommended to make a PowerPoint presentation in conjunction with the following outline.  I. Technical Communication  A. Technical Terms and Definitions  II. What is a Career?  III. What are Green Energy Careers?  IV. Green Energy Careers   1. Geothermal Energy 2. Hydropower Energy 3. Petroleum Energy 4. Solar Energy 5. Wind Energy 6. Biomass Energy   V. What is Inside a Career?   1. Exercise-Create a Career Presentation 2. Complete Online Career Quiz |
| **Guided Practice \*** | Open Microsoft Word on your computer.  Open What Is in A Career? Exercise document.  Review the assignment with your students. |
| **Independent Practice/Laboratory Experience/Differentiated Activities \*** | Students can complete the Finding the Right Career for You! Handout; and will create a career presentation using Microsoft Word. |
| **Lesson Closure** |  |
| **Summative/End of Lesson Assessment \*** | Question: What are the available careers in the Solar Energy industry?  Answer: The available careers in Solar Energy are: Urban Planner, Solar Operations Engineer, Environmental Engineer, Solar Lab Technician, Solar Power Installer, Wind Turbine Fabricator, Energy Efficiency Builder, Sustainability Systems Developer, and Solar Hot Water Installer.  Question: What are the available careers in the Wind Energy industry?  Answer: The available careers in Wind Energy are Wind Turbine Technician, Design Engineer, Proposal Writer, Construction Manager, Large Load Transportation Specialist, and Utility Program Manager.  Informal Assessment:  Students are using Microsoft PowerPoint to create their career presentation.  Formal Assessment:  Students will complete the Career Presentation using Microsoft Word document and answer the reflection questions, “How important do you think it is to research career choices? What are some of the benefits that you can obtain from this research?” and will be evaluated through the rubric. |
| **References/Resources/**  **Teacher Preparation** | * Dictionary.com * Bioenergy Center * Green Energy Jobs * Greenmap.org * Solar Cooler Planet * Energy4Me.org * Khake.com * US Department of Energy |
| 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) | Extension/Enrichment:   1. Students will present/discuss their Career Presentation in class. |
| **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)