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| **TEXAS CTE LESSON PLAN**  [www.txcte.org](http://www.txcte.org) | |
| **Lesson Identification and TEKS Addressed** | |
| **Career Cluster** | Transportation, Distribution & Logistics |
| **Course Name** | Management of Transportation Systems |
| **Lesson/Unit Title** | ­Introduction to Hazardous Materials Regulations and Hazardous Materials  Transport |
| **TEKS Student Expectations** | **130.461. (c) Knowledge and skills**  (3) The student demonstrates an understanding of the U.S.  Department of Transportation, Environmental Protection Agency  and Occupational Safety and Health Administration hazardous  materials regulations. The student is expected to:  (B)explain U.S. Department of Transportation, Environmental Protection Agency, and Occupational Safety and Health Administration compliance requirements concerning hazardous materials, hazardous waste operations, medical surveillance, personnel training, adequate ventilation, confined space hazards, and emergency preparedness and response |
| **Basic Direct Teach Lesson**  (Includes Special Education Modifications/Accommodations and  one English Language Proficiency Standards (ELPS) Strategy) | |
| **Instructional Objectives** | **Students will…**   * Identify the agencies responsible for regulating hazardous materials transportation in the United States. * Define hazardous materials. * Identify placards. * Identify the purpose for placarding vehicles transporting hazardous materials. |
| **Rationale** | In this lesson, students will focus on compliance requirements concerning hazardous materials and the transportation of hazardous waste materials. |
| **Duration of Lesson** | 2 45-minute class periods |
| **Word Wall/Key Vocabulary**  *(ELPS c1a, c, f; c2b; c3a, b, d; c4c; c5b) PDAS II (5)* | * EPA * FAA * FMCSA * hazardous material / HazMat * OSHA * PHMSA * Placard * USDOT |
| **Materials/Specialized Equipment Needed** | * Examples of HazMat placards * images of vehicles / vessels with HazMat placards |
| **Anticipatory Set**  (May include pre-assessment for prior knowledge) | As you travel along a highway, you see numerous truck & trailer combinations; tanks, traditional cargo boxes, containers, specialized carriers, and many other configurations. Many of these containers display diamond-shaped labels placed in highly visible locations.  Today we will answer these questions:   * What do these symbols mean? Do you know? * Why are they so special? * Are they regulated by law? |
| **Direct Instruction \*** | Transportation is defined as the safe and efficient movement of people and goods in an environmentally conscious manner. Some of the goods that are moved are defined as hazardous materials. Hazardous materials is a group or class of materials that are designated as hazardous because it has been determined that transporting these materials pose an unreasonable risk to health, safety, or property. Although classified as hazardous many of these materials are critical to the economy and our standard of living. Some materials classified as hazardous include: gasoline, medicines, oxygen, diesel, fertilizer, pesticides, fire extinguishers, air bag components, refrigerants, and batteries.  The agencies that are designated to regulate hazardous materials include the US Department of Transportation (USDOT), the Occupational Safety and Health Administration (OSHA), and the Environmental Protection Agency (EPA).  The USDOT controls and regulates transportation of hazardous materials. Agencies in the USDOT that have a role include the Pipeline and Hazardous Materials Safety Administration (PHMSA), the Federal Motor Carrier Safety Administration (FMCSA), the Federal Aviation Administration (FAA) and the United States Coast Guard (USCG).  OSHA governs safety in the workplace and is involved in insuring driver and worker safety regarding hazardous materials transportation. The EPA regulates hazardous materials as they may impact the community and environment including handling, environmental cleanup and disposal. Hazardous materials are identified two ways during shipment. First, the hazard is identified on the shipping paper or manifest, and second, the load must be placarded or labeled. For transport purposes, there are nine classes of hazardous materials or dangerous goods; each of these groups has been assigned a unique set of color coded placards and warning labels. These groups are:   * Class 1 Explosives (orange with explosive symbol) * Class 2 Gases (gases placard colors depend on the gas hazard may be green, yellow, red or white) * Class 2 Flammable Liquids and Combustible Liquids (red with flame) * Class 4 Flammable Solids and Combustible Solids (depends upon solid hazard may be red/white, red/white stripe, or blue) * Class 5 Oxidizes and Organic Peroxides (yellow) * Class 6 Toxic materials and Infections Substances (white with skull and crossbones) * Class 7 Radioactive Materials (yellow/white with radiation symbol) * Class 8 Corrosives Materials (white/black with corrosive symbol) * Class 9 Miscellaneous Dangerous Goods (black/white stripe/white)   A hazardous material placard is a minimum of 10.8 inches on each side. The placard must be prominently displayed on all 4 sides of the vessel or vehicle. A placard identifies a hazardous material through 4 characteristics: color, class number, symbol and identification number or hazard name. The purpose of the placard is to assist first responders with identification of a hazard when responding to an incident using hazardous materials.  *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 \*** | **Students will…**   * Work together in teams/groups to answer the following questions:   + Define the phrase hazardous material.   + Discuss why hazardous materials may need to be transported.   + Identify regulations applicable to hazardous materials transport.   *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 will…**   * Use craft supplies (scissors, markers, colored paper, manila folders, glue, tape, etc.) to make HazMat placards of their choice, aligned to actual HazMat standards.   Please note: These products may become part of a student authentic assessment portfolio.  *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** | **Students will…**   * Participate in a brief whole class activity to prepare for the lesson assessment using the placards they created, and/or * Participate in a brief class discussion designed to prepare for the lesson assessment.   *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 \*** | **Students will…**   * Correctly answer a minimum of 70% of the questions on the lesson assessment to demonstrate mastery of this material.   *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** | * North American Emergency Response Guide. Available in hard copy or free online. Downloadable PDF version: <http://www.tc.gc.ca/eng/canutec/guide-ergo-guidepdf-436.htm> * Online searchable version: <http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/ergmenu.aspx> * PHMSA: [www.phmsa.dot.gov](http://www.phmsa.dot.gov/) * Environment, Health and Safety online: [www.ehso.com/dotregs.htm](http://www.ehso.com/dotregs.htm) * Wally Wise Guy: <http://www.wally.org/> (although geared to a younger age group the content is educational and may be useful. |
| **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)** | DECA, SkillsUSATexas |
| **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)