

Statewide Transportation, Distribution, and Logistics (TDL) Curriculum:

Contextualized Science
Module

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FOUNDATIONS FOR DESIGN

- ✓ Instruction emphasizes learning by doing through projects and simulations; therefore, the instructor is a facilitator or learning coach.
- ✓ Content is contextualized for Transportation, Distribution and Logistics (TDL) professions and their programs of study.
- ✓ Learning outcomes often require learners to meet and interact with academic and TDL professionals, engage in collaborative and individual projects involving authentic materials and resources, and complete documents and writing tasks for career paths with the guidance of learning facilitators.
- ✓ Specific units within modules may serve as precursors for additional units within the module. Many lessons and units may be repeated and expanded from one module to another.
- ✓ Self-advocacy and continual self-assessment and self-monitoring are inherent to each module while students must be introduced to, required to meet with, and encouraged to consult with the program coordinator as well as academic and employment professionals.
- ✓ Site visits to TDL and learning facilities, guest speakers, and conferences with employment and academic professionals are integral to the relevance and value of the program for students.

ASSUMPTIONS:

- ✓ Each agency or instructor who may use these modules or this program will adapt instructional strategies, content level of difficulty, learning activities and projects to meet the needs of the program's target population and adult learners of lower and higher academic levels.

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- ✓ Referenced resources, relevant Internet links, learning activities (created, suggested, attached, or referenced) will be used, modified, or omitted based on student need and restraints of class time and resources.
- ✓ This bridge program will work in established internal partnerships within the academic community as well as external partnerships/relationships in the employment community.
- ✓ Units and lessons will be adapted to fit within varying contact hours of a program.

Rationale: Modern TDL technology relies upon the application of a wide variety of sciences. Those who work in TDL need to be aware of these scientific principles. To be productive, workers must be able to understand and implement the science of TDL processes. This is imperative in order for the American TDL industry to remain competitive in the global economy.

Module Description: The Contextualized Science Module offers the adult learner the opportunity to learn foundation science skills. The module presents basic science skills in many areas. The range of sciences used in the scope of TDL is beyond any one class. This module provides a basic understanding of scientific principles and a foundation for learning new principles specific to each industry and/or important for future learning in post-secondary education. The course covers environment and ecosystems, atmosphere and weather, Newton's Laws, friction, forms of energy, velocity and acceleration, basic chemistry, resources and fossil fuels, and machinery.

i-Pathways Alignment with the statewide Transportation, Distribution, and Logistics Curriculum: The lessons identified in this document have connections with both i-Pathways and the intended learning objectives identified in the statewide Transportation, Distribution, and Logistics curriculum. The i-Pathways lessons can be used to build background knowledge, reinforce content, or provide learners with additional practice in a specific skill development.

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Learning Outcomes

Students will:

- Define and describe biomes
- Identify the layers of the Earth's atmosphere and discuss weather conditions
- Demonstrate an understanding of Newton's Laws
- Review and discuss friction and driving
- Define and differentiate between kinetic and potential energy
- Determine the characteristics of speed, velocity, and acceleration in motion
- Recognize the four different states of matter
- Describe and discuss differences between non-renewable and renewable resources
- Define work
- Identify and analyze the uses of simple and compound machines

Methods of Instruction

- Lectures
- Discussions
- Brainstorming
- Experiments

Methods for Evaluating Student Performance

- Teacher observations
- Student's compare/contrast lists
- Experiments

Module Overview

- A. Transportation and Environment
- B. Transportation, Earth's Atmosphere and Weather Conditions
- C. Newton's Laws of Motion

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- D. Transportation and Friction
- E. Energy in Motion
- F. Speed, Velocity, and Acceleration
- G. Basic Chemistry
- H. Resources and Fossil Fuels
- I. Transportation and Machinery

Module Outline

- 1. Transportation and Environment
 - A. Biomes
 - a. Aquatic
 - i. Freshwater
 - ii. Saltwater
 - b. Terrestrial
 - i. Desert
 - ii. Forest
 - iii. Grassland
 - iv. Tundra
 - B. Transportation and Pollution
 - a. Air Pollution
 - b. Water Pollution
- 2. Transportation, Earth's Atmosphere and Weather Conditions
 - A. Earth's Atmosphere
 - a. Troposphere
 - b. Stratosphere
 - c. Mesosphere
 - d. Thermosphere
 - e. Exosphere
 - B. Weather Conditions
 - a. Wind
 - b. Tornadoes
 - c. Rain
 - d. Freezing Rain

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- e. Thunderstorms
 - f. Snow
3. Newton's Laws of Motion
- A. Newton's 1st Law of Motion
 - B. Newton's 2nd Law of Motion
 - C. Newton's 3rd Law of Motion
4. Transportation and Friction
- A. Force
 - B. Friction
 - a. Static
 - b. Kinetic
 - C. Coefficient of Friction
 - D. Friction and Driving
 - E. Friction and Weather Conditions
 - a. Rain
 - b. Snow
 - F. Friction and Traction
5. Energy in Motion
- A. Law of Conservation
 - B. Kinetic Energy
 - C. Potential Energy
6. Speed, Velocity, and Acceleration
- A. Speed
 - B. Velocity
 - C. Acceleration
7. Basic Chemistry
- A. Matter
 - a. Solids
 - b. Liquids
 - c. Gases
 - d. Plasma

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- 8. Resources and Fossil Fuels
 - A. Non-Renewable Resources
 - a. Fossil Fuels
 - i. Coal
 - ii. Crude Oil
 - iii. Natural Gas
 - B. Renewable Resources
 - a. Biofuel
 - b. Ethanol
 - c. Biodiesel

- 9. Transportation and Machinery
 - A. Machinery
 - a. Simple Machines
 - i. Screw
 - ii. Wedge
 - iii. Inclined Plane
 - iv. Lever
 - v. Wheel & Axle
 - vi. Pulley
 - b. Compound Machines
 - i. Engines
 - ii. Alternators
 - iii. Brakes
 - 1. Drum Brakes
 - 2. Disc Brakes
 - 3. Air Brakes