

GRADE 8 TRANSPORTATION TECHNOLOGY

Description

This course is a basic study of transportation systems focusing primarily on the four modes of transportation, land, marine, atmospheric, and space. The student will also explore energy resources, alternative means for energy and their effects upon the environment. Students will engage in the construction of models incorporating simple machines and apply science and math concepts to test and evaluate the outcome.

Course Overview

Course Objectives

Students should:

- develop an understanding of the influence of technology on history.
- select and use transportation technologies.
- understand the technical, social and environmental aspects of transportation systems.
- select and use energy and power technologies.
- demonstrate an understanding of problem solving techniques.
- select and use manufacturing technologies.
- demonstrate the use of the engineering design process.
- develop an awareness of careers in transportation technology.

Essential Questions

- What are typical modes of transportation for moving people and/or goods?
- Can you identify the strengths and weaknesses of transportation systems?
- How do you apply transportation concepts to vehicle engineering?
- What are some innovations in transportation in the US?
- How can engineering design and modern materials help improve transportation?
- What decisions relate to the use of energy?
- How do individual decisions about transportation and energy use affect society and the environment?

Assessments

Common Assessments

- Evaluation Rubric

Skill Assessments

- Teacher observation
- Students demonstration
- Writing prompts
- Test/quizzes

Content Outline

- I. [Unit 1](#) – Introduction to Transportation Technology
- II. [Unit 2](#) – Air/Space
- III. [Unit 3](#) - Land
- IV. [Unit 4](#) - Marine
- V. [Unit 5](#) - Intermodal
- VI. [Unit 6](#) - Energy

Standards

Connecticut State Technology Education standards have been met in the following areas:

- *Transportation Tech*

Grade Level Skills

Students will:

- utilize basic skills to develop and modify projects.
- analyze and apply scientific laws affecting vehicles.
- design and develop projects that utilize the core areas of transportation technology.

Pacing Guide

Marking Period

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
Unit 1 Introduction to Transportation Tech 1 week	Unit 2 Air/Space 1.5 weeks	Unit 3 Land 3 weeks		Unit 4 Marine 1.5 weeks		Unit 5 Intermodal 1 week	Unit 6 Energy 1 week	

Unit 1 – Introduction to Transportation Technology, 1 week [top](#)

Standards

Transportation Technology

TRAN.01 Identify historical, social, economic, environmental, and government regulations impact transportation technology.

TRAN.01.01, TRAN.01.02

Unit Objectives

Students will be able to:

- describe how society uses resources and distributes its goods and services.
- engage in problem solving activity(s).
- describe how technological developments have changed how goods and people are transported.

Essential Questions

- How have historical innovations assisted in the evolution of transportation systems?

Focus Questions

- What is transportation?
- How do humans move people and things?
- How do engineers think about problem solving?

Assessments

- Teacher observation
- Quiz on modes of transportation
- Student demonstration of problem solving solutions

Skill Objectives

Students will:

- solve engineering related “problem solving activities” with other students.
- engage in design challenges to solve problems in moving objects.

Unit 2 – Air/Space, 1.5 weeks [top](#)

Standards

Transportation Technology

TRAN.02 Identify historical, social, economic, environmental, and government regulations impact transportation technology.

TRAN.02.02

Unit Objectives

Students will be able to:

- demonstrate how propulsion, control, guidance, payload, and support systems are used in air transportation.
- describe the impact of air and space travel on the 21st century.

Essential Question

- How has mankind benefitted from air and space travel?

Focus Questions

- What makes a vehicle fly?
- What must designers consider when developing an air/space vehicle?
- Why is feedback so important to the vehicle design process?

Assessments

- Teacher observation
- Quiz on air and space transportation
- Air/space project grading rubric

Skill Objectives

Students will:

- classify types of air and space vehicles.
- apply principles of flight.
- apply the design process – measure, drawings, sketching, working with computers and tools.
- discuss proposed design with teacher and make modifications.
- construct, test, evaluate and modify a design.
- test and modify air/space vehicle.

Unit 3 – Land Transportation 3 weeks [top](#)

Standards

Transportation Technology

TRAN.02 Identify historical, social, economic, environmental, and government regulations impact transportation technology.

TRAN.02.04

Unit Objectives

Students will be able to:

- design, build and evaluate a simple fixed path or variable path transportation system.
- describe the importance of land transportation on society worldwide.

Essential Question

- Why is land transportation so important to the economy of the United States?

Focus Questions

- Why do you consider aerodynamics in vehicle body design?
- What needs to be considered when designing a land vehicle?
- Why is vehicle performance important?

Assessments

- Teacher observation
- Quiz on land transportation
- Land project grading rubric

Skill Objectives

Students will:

- create design sketches.
- design, build and evaluate a simple land transportation system.
- discuss proposed design with teacher and make modifications.
- test and modify land vehicle.

Unit 4 – Marine, 1.5 week [top](#)

Standards

Transportation Technology

TRAN.02 Identify historical, social, economic, environmental, and government regulations impact transportation technology.

TRAN.02.05

Unit Objectives

Students will be able to:

- apply the design process – measure, drawings, sketching, working with computers and tools.
- solve a simple marine transportation problem by designing, building, and testing a vehicle that will carry a payload a specified distance.

Essential Question

- How has marine transportation impacted the history of Western civilization?

Focus Questions

- Why are different hull designs used in different settings?
- What needs to be considered when designing a marine vehicle?
- Why do we need the design process?

Assessments

- Water transportation question sheet
- Boat project rubric
- Teacher observation

Skill Objectives

Students will:

- classify types of water transportation.
- apply principles of density to boat flotation.
- discuss proposed design with teacher and make modifications. Construct, test, evaluate and modify a design.
- test and modify vessel in water tank.

Unit 5 - Intermodal, 1 week [top](#)

Standards

Transportation Technology

TRAN.02 Identify historical, social, economic, environmental, and government regulations impact transportation technology.

TRAN.02.09

Unit Objectives

Students will be able to:

- apply transportation principles to intermodal design.
- apply the design process – measure, drawings, sketching, working with computers and tools.
- use design-based learning approaches that intentionally integrate the content and process of science and/or mathematics education with the content and process of technology and/or engineering education.

Essential Question

- What impacts do intermodal transportation systems have on urban life?

Focus Questions

- Why are intermodal vehicles developed?
- Who could benefit from the use of an intermodal vehicle?
- What might be some design challenges in developing intermodal vehicles?

Assessments

- Intermodal transportation question sheet
- Intermodal project rubric
- Teacher observation

Skill Objectives

Students will:

- identify types of intermodal vehicle.
- create design sketches.
- discuss proposed design with teacher and make modifications.
- construct, test, evaluate and modify a design.
- test and modify intermodal vehicle.

Unit 6 - Energy, 1 week [top](#)

Standards

Transportation Technology

TRAN.02 Identify historical, social, economic, environmental, and government regulations impact transportation technology.

TRAN.02.08

Unit Objectives

Students will be able to:

- compare and contrast traditional and alternative energies.
- model an energy production source.
- design and apply and the uses of different energy and power technologies.

Essential Question

- Which energy sources are the most influential to our society?

Focus Questions

- Why would you choose to use alternative energy?
- What do communities consider when making decisions about the types of energy to use?

Assessments

- Energy question sheet
- Energy project rubric
- Teacher observation

Skill Objectives

Students will:

- identify different types energy
- identify uses of energy.
- identify different types of energy production.
- define alternative energy.
- construct, test, evaluate and modify a design.
- test and modify the energy production source.