Unit 04: Transporation

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **FY**
Status: **Published**

Standards Alignment

New Jersey Student Learning Standards

SCI.HS-ETS1	Engineering Design
SCI.HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Integration of Career Readiness, Life Literacies and Key Skills

12.9.3.12.TD.1	Describe the nature and scope of the Transportation, Distribution & Logistics Career Cluster and the role of transportation, distribution and logistics in society and the economy.
12.9.3.12.TD.2	Describe the application and use of new and emerging advanced techniques to provide solutions for transportation, distribution and logistics problems.
12.9.3.12.TD.3	Describe the key operational activities required of successful transportation, distribution and logistics facilities.
12.9.3.12.TD.4	Identify governmental policies and procedures for transportation, distribution and logistics facilities.
12.9.3.12.TD.6	Describe career opportunities and means to achieve those opportunities in each of the Transportation, Distribution & Logistics Career Pathways.
12.9.3.12.TD-HSE.1	Describe the health, safety and environmental rules and regulations in transportation, distribution and logistics workplaces.
12.9.3.12.TD-HSE.2	Develop solutions to improve performance of health, safety and environmental management services.
12.9.3.12.TD-OPS.1	Develop and evaluate transportation plans to move people and/or goods to meet customer requirements.
12.9.3.12.TD-OPS.2	Analyze performance of transportation operations in order to improve quality and service levels and increase efficiency.
12.9.3.12.TD-OPS.3	Comply with policies, laws and regulations in order to maintain safety, security and health and mitigate the economic and environmental risk of transportation operations.
12.9.3.12.TD-SYS.3	Describe ways to improve the system utilization, flow, safety and environmental performance of transportation systems.
12.9.3.TD	Transportation, Distribution & Logistics
12.9.3.TD-HSE	Health, Safety, & Environmental Management
12.9.3.TD-OPS	Transportation Operations

12.9.3.TD-SYS	Transportation Systems / Infrastructure Planning, Management & Regulation
CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Technology / Integration of Computer Science and Design Thinking

TECH.8.2.12	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
TECH.8.2.12.A	The Nature of Technology: Creativity and Innovation: Technology systems impact every aspect of the world in which we live.
TECH.8.2.12.A.1	Propose an innovation to meet future demands supported by an analysis of the potential full costs, benefits, trade-offs and risks, related to the use of the innovation.
TECH.8.2.12.A.2	Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
TECH.8.2.12.A.3	Research and present information on an existing technological product that has been repurposed for a different function.
TECH.8.2.12.B	Technology and Society: Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.
TECH.8.2.12.B.3	Analyze ethical and unethical practices around intellectual property rights as influenced by human wants and/or needs.
TECH.8.2.12.B.5	Research the historical tensions between environmental and economic considerations as driven by human needs and wants in the development of a technological product, and present the competing viewpoints to peers for review.
TECH.8.2.12.C	Design: The design process is a systematic approach to solving problems.
TECH.8.2.12.C.2	Analyze a product and how it has changed or might change over time to meet human needs and wants.
TECH.8.2.12.D	Abilities for a Technological World: The designed world is the product of a design process that provides the means to convert resources into products and systems.
TECH.8.2.12.D.1	Design and create a prototype to solve a real world problem using a design process, identify constraints addressed during the creation of the prototype, identify trade-offs made, and present the solution for peer review.

TECH.8.2.12.D.4	Assess the impacts of emerging technologies on developing countries.

Interdisciplinary Connections: NJSLS for ELA, Social Studies, Science and/or Math Section

LA.K-12.NJSLSA.SL	Speaking and Listening
	Comprehension and Collaboration
LA.K-12.NJSLSA.SL1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
LA.SL.11-12.1.A	Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well reasoned exchange of ideas.
LA.SL.11-12.1.B	Collaborate with peers to promote civil, democratic discussions and decision-making, set clear goals and assessments (e.g., student developed rubrics), and establish individual roles as needed.

Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media LiteracyNew Section

see Crosswalks

21st Century Life and Careers

Stage I: Desired Results

Transfer/Overview/Rationale

Transfer / Overview / Rationale

Unit Rationale

The purpose of this unit…

This unit will allow students to explore transportation-related careers that cater to often overlooked communities, as well as some of the technical skills required for these careers.

Meaning

Essential Questions

Essential Questions

- **What are the many ways in which goods and/or people are moved from location to location?**
- **What is the process in designing a transportation system?**
- **What role does the environment play in transportation design?**

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

- **Transportation takes place in various forms and often includes multiple forms.**
- **Transportation systems are designed to meet specific goals and regulations of the user.**
- **Environmental impact regulates what forms of transportation can be utilized and where they can be placed.**

Acquisition (Student Learning Objectives)

Knowledge

Knowledge

Students will know…

- **Understand how the environment impacts transportation**
- **The modes of transportation as well as any sub classifications**
- **How transportation impacts society**
- **The evolution of transportation over time**
- **How different goods are transported**

Skills

Skills

Student will be skilled at …

- **Identify and apply the design process steps**
- **Apply the basic rules of aerodynamics**
- **Apply drafting techniques to create a final design**
- **Demonstrate knowledge of the metric measuring system**
- **Identify the various methods of transportation available in our society**
- **Develop a viable solution to the problem using the steps of the design process**
- **Complete 2D and 3D drawings**
- **Select and utilize resources that have been modified by digital tools (e.g., CNC equipment, CAD software) in the creation of a technological product or system**
- **Develop a model to explain the use and features of the residence**
- **Write a self- and design- evaluation for the project**

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

- **CTE curriculum**
- **Dragster Design (TSA competitive event)**

Formative Assessment Strategies

Formative Assessment Strategies

- **Exit ticket**
- **Engineering notebooks**
- **Notebook checks**
- **Design sketches**
- **Twitter board**
- **Teacher-led questions and discussion**
- **Morph chart**
- **Peer feedback**
- **Scale model**
- **What did we learn? chart**

- **KWL chart**
- **Daily design logs**
- **Feedback meetings with teacher**
- **Self rating on cleanup/organization**
- **Presentation run-throughs**
- **Thumbs up/down/sideways**

Learning Activities/Unit of Study

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- **Do Now- take out materials from the previous day, log on to computers and open up documents, small activity to recap the day before.**
- **Review - recap on material that has been covered (questions, discussion, whiteboard)**
- **Lecture on transportation.**
- **Demos- the teacher will lead step by step demos on illustrator where the students**
- **Students will work in teams to complete a design project.**
- **Students will review illustrator skills through tutorials and demos.**
- **Student led instruction**
- **Thumbs up/down/sideways - quick formative assessment to gauge students level of understanding.**
- **Student presentations- students will present their ideas to the class to receive feedback from their classmates.**
- **Feedback meetings- students will meet with teacher at the conclusion of each step in order to get the teachers approval before moving forward.**
- **Open lab days- students will work on design projects or assignments(students/teams may be at different steps of the project).**
- **Students will work on step by step design tutorials.**
- **Testing and evaluation- students along with the teacher will test student projects and evaluate the projects success.**

Modifications and/or Accommodations

Suggested Modifications (ELL, Sp. Ed, GIfted, At-risk of Failure)

English Language Learners

Native language support: The teacher provides auditory or written content to students in their native language.

Adjusted Speech: The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

Visuals: The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students

better understand and comprehend the subjects at hand.

Front-Loading Vocabulary: The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

Special Education Students

Chunking: The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

Checking for Understanding: It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the concepts being covered in a way that makes sense to them.

Extra time: The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

Oral Reading: The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

Timers: The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how much time they have to complete an assignment.

Students with 504 Plans

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Gifted & Talented Strategies

Extensions/Enrichments: Teachers will provide gifted and talented students with

extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

Modify/Change Activities: Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

Students at Risk of School Failure

Directions or Instructions: Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure he/she hasn't forgotten.

Peer Support: Peers can help build confidence in other students by assisting in peer learning. Many teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

Alternate or Modified Assignments: Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just may be that you will need to assign an alternate assignment.

Increase One to One Time: When other students are working, always touch base with your students at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

Contracts: It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

Hands On: As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

Tests/Assessments: Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

Seating: Seat students near a helping peer or with quick access to the teacher. Those with hearing or sight issues need to be close to the instruction which often means near the front.