Marking Period	Unit Title	Recommended Instructional Days
1	Shop and Machine Safety Review	40

9.1 Personal Financial Literacy
Disciplinary Concept:

Core Ideas and Performance Expectation:

9.2 Career Awareness, Exploration, Preparation, & Training
Disciplinary Concept:
Career Awareness and Planning

Core Ideas and Performance Expectation:

Career Awareness and Planning
There are strategies to improve one's professional value and marketability.
9.2.12.CAP.2: Develop college and career readiness skills by participating in opportunities such as structured learning experiences, apprenticeships, and dual enrollment programs.
9.2.12.CAP.3: Investigate how welding skills apply to different career pathways.

Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
9.2.12.CAP.5: Develop a plan for obtaining welding certifications and technical training.

9.3 CTE
Disciplinary Concept:
Architecture & Construction
Construction
Manufacturing

Core Ideas and Performance Expectation:

Architecture & Construction
9.3.12.AC.2: Use architecture and construction skills to create and manage a project.

Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

Essential Question/s:
What hazards are associated with each machine found in the shop?
What preventative measures do we take to prevent injury?
Where is the safety equipment located in the shop and how do we operate it?

Activity Description:

Activity 1: Hazard Identification Scavenger Hunt

Objective: Identify hazards associated with each machine in the shop.

1. Setup: Create a checklist of potential hazards (e.g., entanglement, sharp edges, chemical exposure).
2. Activity: Students work in small groups to inspect the shop and identify hazards for each machine or tool. They document their findings on the checklist.
3. Discussion: Groups present their findings, and the instructor explains how these hazards relate to historical industrial accidents, highlighting how safety practices have evolved.
4. Amistad/History Connection: Discuss contributions of African Americans to industrial safety advancements, such as Garrett Morgan's invention of safety equipment like gas masks.

Activity 2: Safety Protocol Role-Play

Construction
9.3.12.AC-CST.5: Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.6: Manage relationships with internal and external parties to successfully complete construction projects.

Manufacturing
9.3.12.MN.3: Comply with federal, state and local regulations to ensure worker safety and health and environmental work practices.

9.4 Life Literacy & Key Skills
Disciplinary Concept:
Creativity & Innovation
Critical Thinking & Problem Solving
Information & Media Literacy
Technology Literacy

Core Ideas and Performance Expectation:

Creativity and Innovation
With a growth mindset, failure is an important part of success.
9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).

Innovative ideas or innovation can lead to career opportunities.
9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition.

Critical Thinking and Problem Solving
Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Information and Media Literacy

Objective: Learn preventative measures to avoid injury.

1. Setup: Assign each group a specific machine or tool.
2. Activity: Groups create and perform a short role-play demonstrating proper safety protocols for operating their assigned equipment, including PPE use and emergency procedures.
3. Reflection: Students discuss how these protocols prevent injuries.
4. Holocaust/History Connection: Reflect on how forced labor during the Holocaust often lacked safety measures, leading to injuries and fatalities, emphasizing the importance of modern workplace safety.

Activity 3: Safety Equipment Exploration

Objective: Locate and understand the operation of shop safety equipment.

1. Setup: Provide a map of the shop with key areas marked (e.g., fire extinguishers, eyewash stations).
2. Activity: Students work in pairs to locate each piece of safety equipment and practice using it under supervision (e.g., simulate using a fire extinguisher or eyewash station).
3. Quiz/Worksheet: Afterward, students complete a worksheet identifying the location and purpose of each item.
4. Historical Tie-In: Discuss how advancements in workplace safety equipment have reduced injuries over time, connecting this to broader labor movements.

Activity 4: Machine Operation Safety Stations

Objective: Learn safe operation of machines, hand tools, power tools, air tools, and chemical handling.

1. Setup: Create stations for different tools/machines (e.g., drill press, lathe, air compressor) with instructions for safe operation.
2. Activity: Students rotate through stations where they practice operating each tool safely under supervision.
3. Reflection: After completing all stations, students write a brief summary of what they learned about preventing injuries while using these tools.

Digital tools such as artificial intelligence, image enhancement and analysis, and sophisticated computer modeling and simulation create new types of information that may have profound effects on society. These new types of information must be evaluated carefully.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions.
9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience.

Technology Literacy
Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.
9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Career Ready Practices

Act as a responsible and contributing community members and employee.
Demonstrate creativity and innovation.
Utilize critical thinking to make sense of problems and persevere in solving them.
Model integrity, ethical leadership and effective management.
Plan education and career paths aligned to personal goals.
Use technology to enhance productivity increase collaboration and communicate effectively.

Social and Emotional Learning:

Competencies and Sub-Competencies

Self-Awareness
• Recognize one's feelings and thoughts
• Recognize the impact of one's feelings and thoughts on one's own behavior
• Recognize one's personal traits, strengths, and limitations
• Recognize the importance of self-confidence in handling daily tasks and challenges

Self-Management

4. Amistad/History Connection: Highlight contributions of African Americans in manufacturing industries and their role in improving workplace conditions.

Activity 5: Fire Suppression Drill

Objective: Properly use fire suppression equipment.

1. Setup: Provide a demonstration on using fire extinguishers and other suppression tools.
2. Activity: Students practice using fire extinguishers on simulated fires (with instructor guidance). Discuss fire prevention strategies in the shop.
3. Holocaust/History Connection: Discuss how unsafe working conditions during historical events led to catastrophic fires (e.g., Triangle Shirtwaist Factory Fire) and how these events influenced modern fire safety laws.

Activity 6: Hazard Mapping Project

Objective: Identify hazards in the shop and propose solutions.

1. Setup: Provide students with a blank map of the shop.
2. Activity:
    - Students work in groups to mark potential hazards on the map (e.g., pinch points, chemical storage areas).
    - Each group proposes solutions for mitigating these risks (e.g., adding guards or signage).
3. Presentation: Groups present their hazard maps and solutions to the class.
4. Historical Tie-In: Discuss how unsafe working conditions historically led to labor reforms that improved workplace safety standards.

Activity 7: Interactive Safety Timeline

Objective: Understand the evolution of workplace safety.

• Understand and practice strategies for managing one's own emotions, thoughts, and behaviors • Recognize the skills needed to establish and achieve personal and educational goals • Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals **Social Awareness** • Recognize and identify the thoughts, feelings, and perspectives of others • Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds • Demonstrate an understanding of the need for mutual respect when viewpoints differ • Demonstrate an awareness of the expectations for social interactions in a variety of settings. **Responsible Decision-Making** • Develop, implement, and model effective problem-solving and critical thinking skills • Identify the consequences associated with one's actions in order to make constructive choices • Evaluate personal, ethical, safety, and civic impact of decisions **Relationship Skills** • Establish and maintain healthy relationships • Utilize positive communication and social skills to interact effectively with others	1. Setup: Provide a timeline template with key dates related to workplace safety laws and innovations. 2. Activity: ● Students research milestones in workplace safety (e.g., OSHA creation, PPE advancements) and add them to the timeline. ● Include discussions on historical events like forced labor during slavery or unsafe factory conditions during WWII. 3. Amistad/Holocaust Connection: ● Highlight how marginalized groups were often subjected to unsafe working conditions historically and how modern laws aim to ensure equity in workplace safety. **Interdisciplinary Connections:** NJSLSA.R7: Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. RST.9-10.7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. WHST.9-12.1: Write arguments focused on discipline-specific content. HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: Teacher Observation Do Now Homework	**Benchmarks:** Quiz Exam Students will be able to safely use/operate tools and equipment

Class Participation Portfolio Discussions Quiz Journal writing Group Assessment Group Interaction/Discussion/Computer Research Self and Peer Evaluations Shop and classroom etiquette Housekeeping critique	With little to no instruction. Students will be able to verbally explain a process when asked. Students will be periodically add to their portfolios **<u>Summative Assessments:</u>** Pre-Test Oral Presentations Projects Rubric Teacher observation Written Assessments Reflective Paper Group Presentations Teacher administered a general shop safety test on the topic discussed during that unit. Hands on Demonstration Completed project Performance test on equipment or tool.

Differentiated Student Access to Content:
Teaching and Learning *Resources/Materials*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
Tiered Content Materials: Textbooks at different reading levels (below, at, and above grade level) Simplified versions of texts with key concepts highlighted Advanced supplementary readings for accelerated learners	Tiered Content Materials: Simplified versions of texts with key concepts highlighted Audio versions of texts for auditory learners or struggling readers Leveled or topical readers at different reading levels Books on tape	Keep material concept-focused and principle-driven. Allow the use of digital translation or grouping students together. Provide multiple means of action and expression.	Advanced Learning Resources: ASE Certification Prep – Encourage study for industry-recognized certifications. OEM Service Manuals – Provide access to detailed manufacturer repair guides.

Audio versions of texts for auditory learners or struggling readers Multimedia Resources: Educational videos and documentaries Interactive online modules and simulations Podcasts and audio recordings Infographics and visual aids Hands-On Materials: Physical manipulatives and models Lab equipment and supplies for experiments Art supplies for creative projects Building materials for engineering challenges	Highlighted text Collaborative Learning Tools: Opportunity to work alone, in pairs, or small groups Structured group roles for small group work Peer tutoring and mentoring programs Individualized Options: Independent study options Compacting the curriculum for advanced learners Varied timelines or check-in points Choice of review activities ESL-Specific Resources: Bilingual dictionaries or glossaries Sentence frames and language scaffolds Visual supports for key vocabulary		Automotive Engineering Textbooks – Explore advanced concepts like hybrid systems and aerodynamics. Online Training & Webinars – Use resources from ASE, Snap-On, and major manufacturers. 3D Modeling & Diagnostic Simulations – Utilize software for digital learning. Hands-On Activities: Advanced Diagnostics & Troubleshooting – Solve complex real-world car issues. Engine Teardown & Rebuild – Fully disassemble and reassemble an engine. Performance Tuning & Fabrication – Work with ECU tuning and custom modifications. Internship/Job Shadowing – Partner with local shops for real-world experience. Competitive Automotive Events – Participate in SkillsUSA or vehicle design competitions. Enrichment & Leadership:

			Student-Led Research & Presentations – Explore future automotive trends. Technical Writing & Blogging – Create repair guides or tutorial videos. Peer Mentorship & Teaching – Lead small group lessons or assist classmates. Cross-Disciplinary Projects – Collaborate with engineering or robotics students. Self-Paced Online Learning – Use CDX Learning or Electude for independent study.

Supplemental Resources

Technology:

- Laptop
- Chromebook
- SmartBoard
- Internet Access
- Projector

Other

<u>Technical Skill Assessments:</u> ***License/Certification/CTE Assessment/ Industry Valued Credential / Stackable Credential***	**<u>Name of Assessment(s):</u>** **<u>Type of Assessment(s):</u>**

Differentiated Student Access to Content: **Recommended *Strategies & Techniques***	

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
Content Differentiation: Tiered content at different complexity levels Variety of textbooks at different reading levels Supplemental materials like videos, podcasts, and interactive modules Compacting curriculum for advanced learners Choice boards allowing students to select learning activities Varied resources/texts on the same topic Process Differentiation: Flexible grouping (whole group, small group, individual) Learning contracts tailored to student needs Interest centers focused on different aspects of a topic	Content Differentiation: Simplified versions of texts with key concepts highlighted Audio versions of texts for auditory learners or struggling readers Leveled readers at different reading levels Bilingual materials for ESL students Visual aids, infographics, and multimedia resources Process Differentiation: Flexible grouping based on readiness levels Scaffolded support like graphic organizers and writing frames Extended time for task completion One-on-one or small group instruction	Content Differentiation: Simplified versions of texts with key concepts highlighted Audio versions of texts for auditory learners Leveled readers at different reading levels Bilingual materials and resources1 Visual aids, infographics, and multimedia resources Modified texts with rewording, reduced extraneous information, and added visuals Process Differentiation: Flexible grouping based on language proficiency levels Scaffolded support like graphic organizers and writing frames Extended time for task completion One-on-one or small group instruction	Content Differentiation: Advanced, above-grade level textbooks and materials Supplementary resources on complex or specialized topics Interdisciplinary curriculum connecting multiple subject areas Primary source documents and advanced readings Access to college-level coursework or materials Process Differentiation: Accelerated pacing of instruction Independent study options on topics of interest Problem-based and project-based learning opportunities Socratic seminars and philosophical discussions

Varied instructional strategies (visual, auditory, kinesthetic) Scaffolded support like graphic organizers and writing frames Technology-enabled instruction (synchronous or asynchronous options) Product Differentiation: Multiple options for demonstrating learning (reports, presentations, models, etc.) Varied assessment methods based on student learning preferences Adjusting product expectations based on student readiness Learning Environment Differentiation: Flexible seating arrangements Options for individual, paired, or group work Varied time allocations for task completion Use of technology to support different learning needs	Use of assistive technology (text-to-speech, speech-to-text tools) Product Differentiation: Multiple options for demonstrating learning (oral presentations, projects, etc.) Adjusted expectations based on IEP/504 goals Alternative assessments aligned with student abilities Use of portfolios to showcase progress over time Learning Environment Differentiation: Flexible seating arrangements Quiet spaces for individual work Sensory tools or fidgets as needed Visual schedules and routines Specialized Supports Implementation of IEP accommodations and modifications ESL supports like sentence frames and vocabulary guides Interventions for at-risk students (e.g. reading interventions)	Use of gestures and total physical response to support verbal instruction Incorporation of students' native language or culture when possible Product Differentiation: Multiple options for demonstrating learning (oral presentations, projects, etc.) Adjusted expectations based on English proficiency levels Alternative assessments aligned with student abilities Use of portfolios to showcase progress over time Learning Environment Differentiation: Flexible seating arrangements Use of learning centers or stations focused on different aspects of a topic Visual schedules and routines Incorporation of culturally relevant materials and examples Specialized Supports: ESL supports like sentence frames and vocabulary guides Use of students' native language for clarification when needed	Mentorship programs with experts in fields of interest Product Differentiation: Open-ended, creative project options Real-world application of learning through authentic tasks Opportunities for original research and experimentation Multimedia presentations and publications Portfolio development to showcase depth of learning Learning Environment Differentiation: Flexible grouping with intellectual peers Access to advanced technology and lab equipment Field trips and off-campus learning experiences Online courses and virtual learning options Competitions and academic challenges Specialized Supports:

	Social-emotional learning supports Ongoing Assessment Frequent formative assessments to monitor progress Data-driven adjustments to instruction Progress monitoring aligned with IEP goals	Frequent opportunities for speaking and listening practice Integration of all four language skills (listening, speaking, reading, writing) Instructional Strategies: Slowing down speech and using clear enunciation Rephrasing and clarifying instructions Using visuals to support verbal instruction Providing content in multiple formats (visual, auditory, kinesthetic) Connecting content to students' interests and cultural backgrounds Utilizing music, melodies, or songs to enhance learning Ongoing Assessment: Frequent formative assessments to monitor progress Data-driven adjustments to instruction Accommodated assessments (e.g., simplified language, added visuals)	Critical and creative thinking skill development Training in research methods and academic writing Guidance on social-emotional needs of gifted learners College and career planning tailored to advanced learners Opportunities to explore passions and develop talents Instructional Strategies: Inquiry-based and discovery learning approaches Higher-order questioning techniques Abstract and complex problem-solving tasks Emphasis on depth and complexity of content Integration of multiple disciplines and perspectives Assessment Options: Pre-assessments to determine readiness levels Performance-based and authentic assessments Self-assessment and reflection opportunities

			Above-grade level standardized testing Credit by examination options

Work-Based Learning Experiences (WBL)- *Previously called Structured Learning Experience (SLE) ***Each course within a CTE program is now required to include at least one WBL each year.*** **Work-Based Learning: Sustained, meaningful interactions with industry or community professionals that foster in-depth, firsthand engagement with the tasks required in a given career field. Experiences may be delivered in workplaces, in the community, at educational institutions, and/or virtually. WBL is aligned with national, state, and/or local standards. WBL develops and reinforces relevant technical, academic, and employability knowledge and skills.**		
WBL Integration/Activity:	**Duration:**	**Brief description of activities:**
Career Fair	1-3 day Event	• Annual School wide Career Fairs with various presentation in the Architecture and Constructions fields
Guest Speakers	1-2 hour a couple times throughout the year	• Guest Speakers
Career Related Competitions	Marking Period long	• Service Learning & Career Related Competitions such as SkillsUSA
Internships (Paid or non-paid)	Summer Internships	• Internship Opportunities
Informational Interviews /Guest Speakers	1-3 day Event	• Annual STEAM Day
Pre- Apprenticeship	Summer long	• Apprenticeship programs
Career Related Competitions	1-3 day Event	• SkillsUSA Competitions

Interactive/Hands-on Demonstrations with industry Professionals (online, in-person)	30-1hr per student throughout the year or one day	• (Online or in-person) Portfolio Critiques, Project Critiques with Industry professionals
Simulated Workbased Experience	Afterschool year long	Simulated Workbased Experience
WBL Partners:		
Career and Technical Student Organization- *Every CTE program must incorporate a Career and Technical Student Organization (CTSO).		
CTSO:	**CTSO Advisor:**	

Freshman Level: Approximately 10 hours	**Sophomore Level: Approximately 20 hours**	**Junior Level: Approximately 50 hours**	**Senior Level: Approximately 75 hours**
Career Awareness- brief exposure to a variety of work settings needs.	Career Exploration- understand the nature of work through first-hand exposure to the workplace.	Career Preparation - builds basic workplace competence	Work-Related Training - a period of work experience for the purpose of training job skills and job-related skills. work experience Students may or may not be paid.

Career fair Guest Speakers Online Career Navigation, Assessments, Videos Informational Interviews Workplace Tours/Field Trips	Informational interviews Job shadowing Workplace tours/worksite visits Simulated Workplace Experience Mock Interviews	Service-learning Interactive/Hands-on demonstrations with industry prof. (online, in person, simulated) Career Cluster Employer Panel Presentations Structured Assignments after a workplace tour, presentation, shadowing Career Related Competitions School-based enterprises Simulated Workplace Experience Non-Paid Work Experience Service Learning/Volunteering	Internships (Paid or Non-Paid) Service Learning Student-led Enterprises Volunteering Work Experience (Paid or Non-Paid) Pre-Apprenticeships Apprenticeship

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)											
X	Amistad Law: *N.J.S.A. 18A 52:16A-88*	X	Holocaust Law: *N.J.S.A. 18A:35-28*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*		Erin's Law: *A-769/S-1130*

Marking Period	Unit Title	Recommended Instructional Days
2	Electronics and Electrical Systems	45

9.1 Personal Financial Literacy

Core Ideas and Performance Expectation:

9.2 Career Awareness, Exploration, Preparation, & Training
Disciplinary Concept:
Career Awareness and Planning

Core Ideas and Performance Expectation:

Career Awareness and Planning
There are strategies to improve one's professional value and marketability.
9.2.12.CAP.2: Develop college and career readiness skills by participating in opportunities such as structured learning experiences, apprenticeships, and dual enrollment programs.
9.2.12.CAP.3: Investigate how welding skills apply to different career pathways.

Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
9.2.12.CAP.5: Develop a plan for obtaining welding certifications and technical training.

9.3 CTE
Disciplinary Concept:
Architecture & Construction
Construction
Manufacturing
Manufacturing Production Process Development

Core Ideas and Performance Expectation:

Architecture & Construction
9.3.12.AC.2: Use architecture and construction skills to create and manage a project.

Construction

Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

Essential Question/s:
What makes a complex circuit?
What are the components of a printed circuit board?
What precautions should be taken when working with electronics?

Activity Description:

Activity 1: Complex Circuit Analysis & Design Challenge

Essential Question: What makes a complex circuit?
Objective: Trace electrical circuits, read schematics

1. Human Circuit Role Play (Modified from2)
    - Students physically model circuits: Assign roles (battery, resistors, switches) with LGBTQ+ and disabled scientists/engineers featured on role cards (e.g. Lynn Conway, trans computer pioneer)
    - Groups create series/parallel combinations, then "debug" mixed complex circuits
    - Incorporates N.J.S.A. 35-4.35 by discussing diverse contributors to electronics
2. PCB Reverse Engineering Lab
    - Analyze pre-made PCBs containing diodes, capacitors, and Hall effect switches
    - Mixed-ability groups: Provide tactile PCB models for visually impaired students

9.3.12.AC-CST.5: Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.6: Manage relationships with internal and external parties to successfully complete construction projects.

Manufacturing
9.3.12.MN.3: Comply with federal, state and local regulations to ensure worker safety and health and environmental work practices.

Manufacturing Production Process Development
9.3.12.MN-PPD.2: Research, design and implement alternative manufacturing processes to manage production of new and/or improved products.

9.4 Life Literacy & Key Skills
Disciplinary Concept:
Creativity & Innovation
Critical Thinking & Problem Solving
Information & Media Literacy
Technology Literacy

Core Ideas and Performance Expectation:

Creativity and Innovation
With a growth mindset, failure is an important part of success.
9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).

Innovative ideas or innovation can lead to career opportunities.
9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition.

Critical Thinking and Problem Solving
Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

- Students create accessibility reports per8 requirements for digital tools

Activity 2: Inclusive PCB Design Project

Essential Question: Components of printed circuit boards?
Objective: PCB design, component functions

1. Diverse Design Challenge
   - Teams design PCBs for assistive technologies (e.g., LGBT center entry systems, wheelchair interfaces)
   - Use Altium principles from4 with ADA accessibility constraints from8
   - Present designs using multiple modalities (verbal, visual, tactile)
2. Component Scavenger Hunt
   - Explore PROMs, relays, and solenoids through stations featuring:
     - Braille labels & audio descriptions
     - LGBTQ+ engineer video explainers (7)
   - Assessment: Create multilingual component guides (English/Spanish/ASL)

Activity 3: Safe Electronics Lab

Essential Question: Electronics safety precautions?
Objective: Safe testing/repair

1. Safety Scenario Role Play (5 Expanded)
   - Act out scenarios featuring:
     - Proper PPE for various abilities
     - Accommodations for neurodiverse technicians
   - Develop safety posters using gender-neutral language and diverse imagery
2. Accessible Repair Station
   - Stations with:
     - Magnification tools & color-contrast testers
     - Left-handed tool adaptations

Information and Media Literacy
Digital tools such as artificial intelligence, image enhancement and analysis, and sophisticated computer modeling and simulation create new types of information that may have profound effects on society. These new types of information must be evaluated carefully.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions.
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Career Ready Practices

Act as a responsible and contributing community members and employee.
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Social and Emotional Learning:

Competencies and Sub-Competencies

Self-Awareness
• Recognize one's feelings and thoughts
• Recognize the impact of one's feelings and thoughts on one's own behavior
• Recognize one's personal traits, strengths, and limitations
• Recognize the importance of self-confidence in handling daily tasks and challenges

- Students document repairs using closed captioning (8)

Diversity Integration

1. Historical Analysis: Research LGBTQ+/disabled electronics pioneers
2. Bias Testing: Audit component datasheets for inclusive language
3. Universal Design Showcase: Present projects to mixed-ability focus groups

Interdisciplinary Connections:
NJSLSA.R7: Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

RST.9-10.7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

WHST.9-12.1: Write arguments focused on discipline-specific content.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Self-Management • Understand and practice strategies for managing one's own emotions, thoughts, and behaviors • Recognize the skills needed to establish and achieve personal and educational goals • Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals **Social Awareness** • Recognize and identify the thoughts, feelings, and perspectives of others • Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds • Demonstrate an understanding of the need for mutual respect when viewpoints differ • Demonstrate an awareness of the expectations for social interactions in a variety of settings. **Responsible Decision-Making** • Develop, implement, and model effective problem-solving and critical thinking skills • Identify the consequences associated with one's actions in order to make constructive choices • Evaluate personal, ethical, safety, and civic impact of decisions **Relationship Skills** • Establish and maintain healthy relationships • Utilize positive communication and social skills to interact effectively with others	
Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: Teacher Observation Do Now Homework Class Participation	**Benchmarks:** Quiz Exam Apply an Engineering Design Process Develop and Test a Solution

Portfolio Discussions Quiz Journal writing Group Assessment Group Interaction/Discussion/Computer Research Self and Peer Evaluations Shop and classroom etiquette Housekeeping critique Completion of safety assignments Examine handouts in notebook for completeness and accuracy of information Project critique and evaluation at completion Observe proper care and use of tools, equipment, and materials Hands on Demonstrations	Improve a Design through Iteration Develop Skills in Graphically Representing Ideas **<u>Summative Assessments:</u>** Pre-Test Oral Presentations Projects Rubric Teacher observation Written Assessments Reflective Paper Group Presentations Maintain Anecdotal Records/Notetaking Teacher administered a general shop safety test on the topic discussed during that unit. Completed project Performance test on equipment or tool.

Differentiated Student Access to Content:
Teaching and Learning *Resources/Materials*

Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
Tiered Content Materials: Textbooks at different reading levels (below, at, and above grade level) Simplified versions of texts with key concepts highlighted Advanced supplementary readings for accelerated learners	Tiered Content Materials: Simplified versions of texts with key concepts highlighted Audio versions of texts for auditory learners or struggling readers Leveled or topical readers at different reading levels Books on tape	Keep material concept-focused and principle-driven. Allow the use of digital translation or grouping students together. Provide multiple means of action and expression.	Advanced Learning Resources: ASE Certification Prep – Encourage study for industry-recognized certifications. OEM Service Manuals – Provide access to detailed manufacturer repair guides.

Audio versions of texts for auditory learners or struggling readers Multimedia Resources: Educational videos and documentaries Interactive online modules and simulations Podcasts and audio recordings Infographics and visual aids Hands-On Materials: Physical manipulatives and models Lab equipment and supplies for experiments Supplies for creative projects Building materials for engineering challenges	Highlighted text Collaborative Learning Tools: Opportunity to work alone, in pairs, or small groups Structured group roles for small group work Peer tutoring and mentoring programs Individualized Options: Independent study options Compacting the curriculum for advanced learners Varied timelines or check-in points Choice of review activities ESL-Specific Resources: Bilingual dictionaries or glossaries Sentence frames and language scaffolds Visual supports for key vocabulary		Automotive Engineering Textbooks – Explore advanced concepts like hybrid systems and aerodynamics. Online Training & Webinars – Use resources from ASE, Snap-On, and major manufacturers. 3D Modeling & Diagnostic Simulations – Utilize software for digital learning. Hands-On Activities: Advanced Diagnostics & Troubleshooting – Solve complex real-world car issues. Engine Teardown & Rebuild – Fully disassemble and reassemble an engine. Performance Tuning & Fabrication – Work with ECU tuning and custom modifications. Internship/Job Shadowing – Partner with local shops for real-world experience. Competitive Automotive Events – Participate in SkillsUSA or vehicle design competitions. Enrichment & Leadership:

			Student-Led Research & Presentations – Explore future automotive trends. Technical Writing & Blogging – Create repair guides or tutorial videos. Peer Mentorship & Teaching – Lead small group lessons or assist classmates. Cross-Disciplinary Projects – Collaborate with engineering or robotics students. Self-Paced Online Learning – Use CDX Learning or Electude for independent study.

Supplemental Resources

Technology:

- Laptop
- Chromebook
- SmartBoard
- Internet Access
- Projector

Other:

-

Differentiated Student Access to Content:
Recommended *Strategies & Techniques*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**

Content Differentiation: Tiered content at different complexity levels Variety of textbooks at different reading levels Supplemental materials like videos, podcasts, and interactive modules Compacting curriculum for advanced learners Choice boards allowing students to select learning activities Varied resources/texts on the same topic Process Differentiation: Flexible grouping (whole group, small group, individual) Learning contracts tailored to student needs Interest centers focused on different aspects of a topic Varied instructional strategies (visual, auditory, kinesthetic) Scaffolded support like graphic organizers and writing frames Technology-enabled instruction (synchronous or asynchronous options) Product Differentiation:	Content Differentiation: Simplified versions of texts with key concepts highlighted Audio versions of texts for auditory learners or struggling readers Leveled readers at different reading levels Bilingual materials for ESL students Visual aids, infographics, and multimedia resources Process Differentiation: Flexible grouping based on readiness levels Scaffolded support like graphic organizers and writing frames Extended time for task completion One-on-one or small group instruction Use of assistive technology (text-to-speech, speech-to-text tools) Product Differentiation: Multiple options for demonstrating learning (oral presentations, projects, etc.)	Content Differentiation: Simplified versions of texts with key concepts highlighted Audio versions of texts for auditory learners Leveled readers at different reading levels Bilingual materials and resources1 Visual aids, infographics, and multimedia resources Modified texts with rewording, reduced extraneous information, and added visuals Process Differentiation: Flexible grouping based on language proficiency levels Scaffolded support like graphic organizers and writing frames Extended time for task completion One-on-one or small group instruction Use of gestures and total physical response to support verbal instruction Incorporation of students' native language or culture when possible Product Differentiation:	Content Differentiation: Advanced, above-grade level textbooks and materials Supplementary resources on complex or specialized topics Interdisciplinary curriculum connecting multiple subject areas Primary source documents and advanced readings Access to college-level coursework or materials Process Differentiation: Accelerated pacing of instruction Independent study options on topics of interest Problem-based and project-based learning opportunities Socratic seminars and philosophical discussions Mentorship programs with experts in fields of interest Product Differentiation: Open-ended, creative project options Real-world application of learning through authentic tasks

Multiple options for demonstrating learning (reports, presentations, models, etc.) Varied assessment methods based on student learning preferences Adjusting product expectations based on student readiness Learning Environment Differentiation: Flexible seating arrangements Options for individual, paired, or group work Varied time allocations for task completion Use of technology to support different learning needs	Adjusted expectations based on IEP/504 goals Alternative assessments aligned with student abilities Use of portfolios to showcase progress over time Learning Environment Differentiation: Flexible seating arrangements Quiet spaces for individual work Sensory tools or fidgets as needed Visual schedules and routines Specialized Supports Implementation of IEP accommodations and modifications ESL supports like sentence frames and vocabulary guides Interventions for at-risk students (e.g. reading interventions) Social-emotional learning supports Ongoing Assessment Frequent formative assessments to monitor progress Data-driven adjustments to instruction	Multiple options for demonstrating learning (oral presentations, projects, etc.) Adjusted expectations based on English proficiency levels Alternative assessments aligned with student abilities Use of portfolios to showcase progress over time Learning Environment Differentiation: Flexible seating arrangements Use of learning centers or stations focused on different aspects of a topic Visual schedules and routines Incorporation of culturally relevant materials and examples Specialized Supports: ESL supports like sentence frames and vocabulary guides Use of students' native language for clarification when needed Frequent opportunities for speaking and listening practice Integration of all four language skills (listening, speaking, reading, writing) Instructional Strategies:	Opportunities for original research and experimentation Multimedia presentations and publications Portfolio development to showcase depth of learning Learning Environment Differentiation: Flexible grouping with intellectual peers Access to advanced technology and lab equipment Field trips and off-campus learning experiences Online courses and virtual learning options Competitions and academic challenges Specialized Supports: Critical and creative thinking skill development Training in research methods and academic writing Guidance on social-emotional needs of gifted learners College and career planning tailored to advanced learners

	Progress monitoring aligned with IEP goals	Slowing down speech and using clear enunciation Rephrasing and clarifying instructions Using visuals to support verbal instruction Providing content in multiple formats (visual, auditory, kinesthetic) Connecting content to students' interests and cultural backgrounds Utilizing music, melodies, or songs to enhance learning Ongoing Assessment: Frequent formative assessments to monitor progress Data-driven adjustments to instruction Accommodated assessments (e.g., simplified language, added visuals)	Opportunities to explore passions and develop talents Instructional Strategies: Inquiry-based and discovery learning approaches Higher-order questioning techniques Abstract and complex problem-solving tasks Emphasis on depth and complexity of content Integration of multiple disciplines and perspectives Assessment Options: Pre-assessments to determine readiness levels Performance-based and authentic assessments Self-assessment and reflection opportunities Above-grade level standardized testing Credit by examination options

Work-Based Learning Experiences (WBL)- *Previously called Structured Learning Experience (SLE)

Each course within a CTE program is now required to include at least one WBL each year. **Work-Based Learning: Sustained, meaningful interactions with industry or community professionals that foster in-depth, firsthand engagement with the tasks required in a given career field. Experiences may be delivered in workplaces, in the community, at educational institutions, and/or virtually. WBL is aligned with national, state, and/or local standards. WBL develops and reinforces relevant technical, academic, and employability knowledge and skills.**		
WBL Integration/Activity:	**Duration:**	**Brief description of activities:**
Career Fair	1-3 day Event	• Annual School wide Career Fairs
Guest Speakers	1-2 hour a couple times throughout the year	• Guest Speakers
Career Related Competitions	Throughout the marking period	• Service Learning & Career Related Competitions such as SkillsUSA
Internships (Paid or non-paid)	Summer Internships	• Internship Opportunities
Informational Interviews /Guest Speakers	1-3 day Event	• Annual STEAM Day
Pre- Apprenticeship	Summer long	• Apprenticeship programs
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Interactive/Hands-on Demonstrations with industry Professionals (online, in-person)	30-1hr per student throughout the year or one day	• (Online or in-person) Portfolio Critiques, Project Critiques with Industry professionals
Simulated Workbased Experience	Afterschool year long	• Simulated Workbased Experience
WBL Partners:		

Content Area: Career Readiness, Life Literacies, and Key Skills (NJSLS-CLKS 9.2, 9.3, 9.4) Grades K - 12
Grade: 10

Dev. Date:

Career and Technical Student Organization- *Every CTE program must incorporate a Career and Technical Student Organization (CTSO).		
CTSO:	**CTSO Advisor:**	

Freshman Level: Approximately 10 hours Career Awareness- brief exposure to a variety of work settings needs.	**Sophomore Level: Approximately 20 hours** Career Exploration- understand the nature of work through first-hand exposure to the workplace.	**Junior Level: Approximately 50 hours** Career Preparation - builds basic workplace competence	**Senior Level: Approximately 75 hours** Work-Related Training - a period of work experience for the purpose of training job skills and job-related skills. work experience Students may or may not be paid.
Career fair Guest Speakers Online Career Navigation, Assessments, Videos Informational Interviews Workplace Tours/Field Trips	Informational interviews Job shadowing Workplace tours/worksite visits Simulated Workplace Experience Mock Interviews	Service-learning Interactive/Hands-on demonstrations with industry prof. (online, in person, simulated) Career Cluster Employer Panel Presentations Structured Assignments after a workplace tour, presentation, shadowing Career Related Competitions School-based enterprises Simulated Workplace Experience Non-Paid Work Experience Service Learning/Volunteering	Internships (Paid or Non-Paid) Service Learning Student-led Enterprises Volunteering Work Experience (Paid or Non-Paid) Pre-Apprenticeships Apprenticeship

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)											
	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*	X	LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*	X	Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*		Erin's Law: *A-769/S-1130*

Marking Period	Unit Title	Recommended Instructional Days
3	**Anti-Lock Brake System, Traction Control and Stability and Climate Control Systems**	**40**

9.1 Personal Financial Literacy
Disciplinary Concept:

Core Ideas and Performance Expectation:

9.2 Career Awareness, Exploration, Preparation, & Training
Disciplinary Concept:
Career Awareness and Planning

Core Ideas and Performance Expectation:

Career Awareness and Planning
There are strategies to improve one's professional value and marketability.
9.2.12.CAP.2: Develop college and career readiness skills by participating in opportunities such as structured learning experiences, apprenticeships, and dual enrollment programs.
9.2.12.CAP.3: Investigate how welding skills apply to different career pathways.

Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
9.2.12.CAP.5: Develop a plan for obtaining welding certifications and technical training.

9.3 CTE
Disciplinary Concept:
Architecture & Construction
Construction
Manufacturing
Manufacturing Production Process Development

Core Ideas and Performance Expectation:

Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

Essential Question/s:
How does an Anti-Lock Brake System work?
How does Traction Control work?
How does air conditioning work?
How does heat and ventilation work?

Activity Description:

Activity 1: ABS & Traction Control Component Lab

Essential Question: *How does an Anti-Lock Brake System work?*
Objective: Identify ABS/TC components and their functions.

1. Component Breakdown & Climate Impact Discussion
   - Students disassemble ABS/TC modules (or use cutaway models) to identify parts (sensors, hydraulic valves, ECUs).
   - Climate Tie-In: Discuss how ABS prevents inefficient "locked wheel" skidding, reducing tire wear and microplastic pollution.
2. Emission Efficiency Role Play

Architecture & Construction
9.3.12.AC.2: Use architecture and construction skills to create and manage a project.

Construction
9.3.12.AC-CST.5: Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.6: Manage relationships with internal and external parties to successfully complete construction projects.

Manufacturing
9.3.12.MN.3: Comply with federal, state and local regulations to ensure worker safety and health and environmental work practices.

Manufacturing Production Process Development
9.3.12.MN-PPD.2: Research, design and implement alternative manufacturing processes to manage production of new and/or improved products.

9.4 Life Literacy & Key Skills
Disciplinary Concept:
Creativity & Innovation
Critical Thinking & Problem Solving
Informations and Media Literacy
Technology Literacy

Core Ideas and Performance Expectation:

Creativity and Innovation
With a growth mindset, failure is an important part of success.
9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).

Innovative ideas or innovation can lead to career opportunities.
9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition.

Critical Thinking and Problem Solving

- Groups role-play as engineers designing ABS for electric vehicles (EVs).
- Compare energy recovery in EV regenerative braking vs. traditional ABS.

Activity 2: System Operation Simulations

Essential Question: *How does Traction Control work?*
Objective: Describe ABS/TC operation and diagnose issues.

1. Virtual Ice Road Challenge
   - Use driving simulators (e.g., Assetto Corsa) to test ABS/TC on virtual icy roads.
   - Collect data on stopping distances with/without ABS and fuel efficiency with/without TC.
2. Fault Injection Diagnostics
   - Instructor introduces faults (e.g., corroded wheel sensors) into training systems.
   - Students use scan tools to diagnose issues, referencing technical service bulletins about weather-related failures.

Activity 3: Climate-Conscious Repair Project

Objective: Repair systems while considering environmental impact.

1. Sustainable Repair Challenge
   - Teams repair faulty ABS modules using:
     - Recycled components (e.g., refurbished sensors)
     - Low-VOC brake fluids (DOT 5.1)
   - Present repair plans with cost/environmental impact analysis.
2. Traction Control & EV Range Lab
   - Use dynamometers to measure how optimized TC systems improve EV battery range on wet surfaces.
   - Relate findings to reduced charging frequency and grid demand.

Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Information and Media Literacy
Digital tools such as artificial intelligence, image enhancement and analysis, and sophisticated computer modeling and simulation create new types of information that may have profound effects on society. These new types of information must be evaluated carefully.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions.
9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience.

Technology Literacy
Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.
9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Career Ready Practices

Act as a responsible and contributing community member and employee.

Attend to financial well-being.

Consider the environmental, social and economic impacts of decisions.

Demonstrate creativity and innovation.

Utilize critical thinking to make sense of problems and persevere in solving them.

Activity 4: Stability Control & Extreme Weather

Essential Question: *How do these systems adapt to climate changes?*

1. Flood Scenario Response
   - Analyze how stability control prevents hydroplaning in heavy rain (increasing due to climate change).
   - Redesign systems using waterproof connectors from TE Connectivity marine-grade parts.
2. Wildfire Smoke Corrosion Study
   - Test sensor performance after exposure to simulated wildfire particulate matter.
   - Propose maintenance schedules for areas with increased air pollution.

Climate Control:

1. **Refrigeration Cycle Demonstration**
   Students create a physical model of the AC system using household items to represent components. They explain the process of heat transfer, vaporization, and condensation as they move through the cycle. Include a discussion on personal boundaries and consent, relating it to the importance of maintaining a safe "personal space" in various environments.
2. **Pressure and Temperature Experiment**
   Students use sealed containers with different amounts of air to observe how pressure affects temperature. They record observations and explain the relationship between pressure and temperature in AC systems. Incorporate a lesson on recognizing and respecting personal comfort levels, relating it to pressure in social situations.
3. **HVAC Controls Simulation**
   Create a mock car interior where students adjust HVAC controls to achieve desired temperatures. They explain how each control affects the system's operation. Include a discussion on the importance of having control over one's environment and body, emphasizing the right to say "no" to unwanted touch.

Model integrity, ethical leadership and effective management.

Plan education and career paths aligned to personal goals.

Use technology to enhance productivity, increase collaboration, and communicate effectively.

Work productively in teams while using cultural/global competence.

Social and Emotional Learning:

Competencies and Sub-Competencies

Self-Awareness
• Recognize one's feelings and thoughts
• Recognize the impact of one's feelings and thoughts on one's own behavior
• Recognize one's personal traits, strengths, and limitations
• Recognize the importance of self-confidence in handling daily tasks and challenges

Self-Management
• Understand and practice strategies for managing one's own emotions, thoughts, and behaviors
• Recognize the skills needed to establish and achieve personal and educational goals
• Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals

Social Awareness
• Recognize and identify the thoughts, feelings, and perspectives of others
• Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds
• Demonstrate an understanding of the need for mutual respect when viewpoints differ
• Demonstrate an awareness of the expectations for social interactions in a variety of settings.

4. **Refrigerant Safety Role-Play**
   Students act out scenarios involving safe handling of refrigerants, emphasizing proper PPE use. Integrate age-appropriate discussions on personal safety, the importance of telling a trusted adult about unsafe situations, and strategies for seeking help.
5. **Heat Movement Visualization**
   Use thermal cameras or heat-sensitive materials to visualize heat movement in different scenarios. Relate this to how our bodies can sense discomfort, emphasizing the importance of trusting one's instincts in potentially unsafe situations.
6. **HVAC System Component Matching Game**
   Create a game where students match components to their functions in heating, ventilation, and AC systems. Include cards with age-appropriate safety tips related to personal boundaries and recognizing inappropriate behavior.

Interdisciplinary Connections:
NJSLSA.R7: Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

RST.9-10.7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

WHST.9-12.1: Write arguments focused on discipline-specific content.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Responsible Decision-Making • Develop, implement, and model effective problem-solving and critical thinking skills • Identify the consequences associated with one's actions in order to make constructive choices • Evaluate personal, ethical, safety, and civic impact of decisions **Relationship Skills** • Establish and maintain healthy relationships • Utilize positive communication and social skills to interact effectively with others	
Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: Teacher Observation Do Now Homework Class Participation Portfolio Discussions Quiz Journal writing Group Assessment Group Interaction/Discussion/Computer Research Self and Peer Evaluations Examine handouts in notebook for completeness and accuracy of information Project critique and evaluation at completion Observe proper care and use of tools, equipment, and materials	**Benchmarks:** Quiz Exam **Summative Assessments:** Pre-Test Oral Presentations Projects Rubric Teacher observation Written Assessments Reflective Paper Group Presentations Teacher administered a general shop safety test on the topic discussed during that unit. Completed project Performance test on equipment or tool.
Technical Skill Assessments: License/Certification/CTE Assessment/ Industry Valued Credential/ Stackable Credential	**Name of Assessment(s):**

	Type of Assessment(s):

Differentiated Student Access to Content: **Teaching and Learning *Resources/Materials***			
Core **Resources**	**Alternate** **Core Resources** ***IEP/504/At-Risk/ESL***	**ELL** **Core Resources**	**Gifted & Talented** **Core Resources**
Tiered Content Materials: Textbooks at different reading levels (below, at, and above grade level) Simplified versions of texts with key concepts highlighted Advanced supplementary readings for accelerated learners Audio versions of texts for auditory learners or struggling readers Multimedia Resources: Educational videos and documentaries Interactive online modules and simulations Podcasts and audio recordings Infographics and visual aids Hands-On Materials: Physical manipulatives and models Lab equipment and supplies for	Tiered Content Materials: Simplified versions of texts with key concepts highlighted Audio versions of texts for auditory learners or struggling readers Leveled or topical readers at different reading levels Books on tape Highlighted text Collaborative Learning Tools: Opportunity to work alone, in pairs, or small groups Structured group roles for small group work Peer tutoring and mentoring programs Individualized Options: Independent study options Compacting the curriculum for	Keep material concept-focused and principle-driven. Allow the use of digital translation or grouping students together. Provide multiple means of action and expression.	Advanced Learning Resources: ASE Certification Prep – Encourage study for industry-recognized certifications. OEM Service Manuals – Provide access to detailed manufacturer repair guides. Automotive Engineering Textbooks – Explore advanced concepts like hybrid systems and aerodynamics. Online Training & Webinars – Use resources from ASE, Snap-On, and major manufacturers. 3D Modeling & Diagnostic Simulations – Utilize software for digital learning. Hands-On Activities: Advanced Diagnostics & Troubleshooting – Solve complex real-world car issues.

experiments Art supplies for creative projects Building materials for engineering challenges	advanced learners Varied timelines or check-in points Choice of review activities ESL-Specific Resources: Bilingual dictionaries or glossaries Sentence frames and language scaffolds Visual supports for key vocabulary		Engine Teardown & Rebuild – Fully disassemble and reassemble an engine. Performance Tuning & Fabrication – Work with ECU tuning and custom modifications. Internship/Job Shadowing – Partner with local shops for real-world experience. Competitive Automotive Events – Participate in SkillsUSA or vehicle design competitions. Enrichment & Leadership: Student-Led Research & Presentations – Explore future automotive trends. Technical Writing & Blogging – Create repair guides or tutorial videos. Peer Mentorship & Teaching – Lead small group lessons or assist classmates. Cross-Disciplinary Projects – Collaborate with engineering or robotics students. Self-Paced Online Learning – Use CDX Learning or Electude for independent study.

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Simulated Workbased Experience	Afterschool year long	• Simulated Workbased Experience
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CTSO:	**CTSO Advisor:**	
ACE Mentorship Program		ACE Mentor Program is an after-school program whose mission is to engage, excite and enlighten high school students to pursue careers in Architecture, Construction, and Engineering through mentoring and to support their continued advancement in the industry.

Content Area: Career Readiness, Life Literacies, and Key Skills (NJSLS-CLKS 9.2, 9.3, 9.4) Grades K - 12
Grade: 10

Dev. Date:

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	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*	X	Standards in Action: *Climate Change*	X	Erin's Law: *A-769/S-1130*

Marking Period	Unit Title	Recommended Instructional Days
4	**Engine Performance and Hybrid and Alternative Fuel Vehicles**	**45**

9.1 Personal Financial Literacy
Disciplinary Concept:

Core Ideas and Performance Expectation:

9.2 Career Awareness, Exploration, Preparation, & Training
Disciplinary Concept:
Career Awareness and Planning

Core Ideas and Performance Expectation:

Career Awareness and Planning
There are strategies to improve one's professional value and marketability.
9.2.12.CAP.2: Develop college and career readiness skills by participating in opportunities such as structured learning experiences, apprenticeships, and dual enrollment programs.
9.2.12.CAP.3: Investigate how welding skills apply to different career pathways.

Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
9.2.12.CAP.5: Develop a plan for obtaining welding certifications and technical training.

9.3 CTE
Disciplinary Concept:
Architecture & Construction
Construction
Manufacturing
Manufacturing Production Process Development

Core Ideas and Performance Expectation:

Architecture & Construction

Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

Essential Question/s:
What is needed to make more horsepower?
How much power is too much power?
What makes a vehicle a hybrid?
What are alternative fuels?

Activity Description:

Horsepower:

1. Horsepower Calculation Lab
   - Students will calculate the horsepower of different engines using formulas and provided data (e.g., torque and RPM).
   - Discuss the role of intake and exhaust systems, turbochargers, and superchargers in increasing horsepower.
2. Turbocharger Demonstration
   - Use a turbocharger model to demonstrate how compressed air increases engine efficiency and power.
   - Students will identify key components of a turbocharger and explain its operation.
3. Exhaust Flow Experiment

9.3.12.AC.2: Use architecture and construction skills to create and manage a project.

Construction
9.3.12.AC-CST.5: Apply practices and procedures required to maintain jobsite safety.
9.3.12.AC-CST.6: Manage relationships with internal and external parties to successfully complete construction projects.

Manufacturing
9.3.12.MN.3: Comply with federal, state and local regulations to ensure worker safety and health and environmental work practices.

Manufacturing Production Process Development
9.3.12.MN-PPD.2: Research, design and implement alternative manufacturing processes to manage production of new and/or improved products.

9.4 Life Literacy & Key Skills
Disciplinary Concept:
Creativity & Innovation
Critical Thinking & Problem Solving
Informations and Media Literacy
Technology Literacy

Core Ideas and Performance Expectation:

Creativity and Innovation
With a growth mindset, failure is an important part of success.
9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).

Innovative ideas or innovation can lead to career opportunities.
9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition.

Critical Thinking and Problem Solving

- Conduct an experiment to measure exhaust backpressure and discuss how reducing backpressure improves engine performance.

Power

Activities:

1. Debate: Power vs. Safety
   - Divide students into groups to debate the advantages and risks of high-horsepower vehicles, considering safety, fuel efficiency, and environmental impact.
2. Case Study Analysis
   - Analyze real-world examples of vehicles with excessive power leading to safety or reliability issues.
   - Discuss the balance between performance and practicality.
3. Nitrous Oxide Safety Workshop
   - Teach students about nitrous oxide properties, its impact on engine power, and the safety precautions required when using it.

Hybrid Vehicles

Activities:

1. Hybrid Vehicle Anatomy Project
   - Students will create diagrams showing the components of a hybrid vehicle (e.g., internal combustion engine, electric motor, battery system).
   - Explain how these components work together for efficiency.
2. Regenerative Braking Simulation
   - Use a model or software to simulate regenerative braking in hybrid vehicles.
   - Students will measure energy recovery rates under different conditions.
3. Hybrid Maintenance Roleplay

Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a).

Information and Media Literacy
Digital tools such as artificial intelligence, image enhancement and analysis, and sophisticated computer modeling and simulation create new types of information that may have profound effects on society. These new types of information must be evaluated carefully.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions.
9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience.

Technology Literacy
Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.
9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

Career Ready Practices

Act as a Responsible and contributing Citizen and Employee
Apply Appropriate Academic and Technical Skills
Attend to Personal Health and Financial Well-Being
Communicate Clearly, Effectively and with Reason
Consider the Environmental, Social and Economic Impacts of Decisions
Demonstrate creativity and innovation
Employ valid and reliable research strategies
Utilize critical Thinking to make sense of problems and persevere in solving them
Model Integrity, ethical leadership and effective management
Plan education and career path aligned to personal goals
Use technology to enhance productivity
Work productively in teams while using cultural/ global competence

- Students will roleplay as technicians performing basic maintenance on hybrid vehicles, focusing on battery care and safety protocols.

Alternative fuels

Activities:

1. Alternative Fuel Research Presentation
   - Assign students various alternative fuels (e.g., E85, biodiesel, hydrogen) to research their properties, benefits, and challenges.
   - Present findings to the class.
2. Fuel Efficiency Comparison Lab
   - Compare fuel efficiency and emissions of gasoline vs. alternative fuels using data or simulations.
3. Alternative Fuel Vehicle Maintenance Workshop
   - Teach students basic maintenance techniques for alternative fuel vehicles, emphasizing unique hazards like high-voltage systems or corrosive materials.

Interdisciplinary Connections:
NJSLSA.R7: Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

RST.9-10.7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

WHST.9-12.1: Write arguments focused on discipline-specific content.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Social and Emotional Learning: ***Competencies and Sub-Competencies***	
Self-Awareness • Recognize one's feelings and thoughts • Recognize the impact of one's feelings and thoughts on one's own behavior • Recognize one's personal traits, strengths, and limitations • Recognize the importance of self-confidence in handling daily tasks and challenges **Self-Management** • Understand and practice strategies for managing one's own emotions, thoughts, and behaviors • Recognize the skills needed to establish and achieve personal and educational goals • Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals **Social Awareness** • Recognize and identify the thoughts, feelings, and perspectives of others • Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds • Demonstrate an understanding of the need for mutual respect when viewpoints differ • Demonstrate an awareness of the expectations for social interactions in a variety of settings **Responsible Decision-Making** • Develop, implement, and model effective problem-solving and critical thinking skills • Identify the consequences associated with one's actions in order to make constructive choices • Evaluate personal, ethical, safety, and civic impact of decisions **Relationship Skills** • Establish and maintain healthy relationships	

• Utilize positive communication and social skills to interact effectively with others	

Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: Teacher Observation Do Now Homework Class Participation Portfolio Discussions Quiz Journal writing Group Assessment Group Interaction/Discussion/Computer Research Self and Peer Evaluations Reverse Engineering Documentation Examine handouts in notebook for completeness and accuracy of information Project critique and evaluation at completion Observe proper care and use of tools, equipment, and materials	**Benchmarks:** Quiz Exam **Summative Assessments:** Pre-Test Oral Presentations Projects Rubric Teacher observation Written Assessments Reflective Paper Group Presentations Teacher administered a general shop safety test on the topic discussed during that unit. Completed project Performance test on equipment or tool.
Technical Skill Assessments: ***License/Certification/CTE Assessment/ Industry Valued Credential / Stackable Credential***	**Name of Assessment(s):** **Type of Assessment(s):**

Differentiated Student Access to Content: **Teaching and Learning *Resources/Materials***			
Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**

Tiered Content Materials: Textbooks at different reading levels (below, at, and above grade level) Simplified versions of texts with key concepts highlighted Advanced supplementary readings for accelerated learners Audio versions of texts for auditory learners or struggling readers Multimedia Resources: Educational videos and documentaries Interactive online modules and simulations Podcasts and audio recordings Infographics and visual aids Hands-On Materials: Physical manipulatives and models Lab equipment and supplies for experiments Art supplies for creative projects Building materials for engineering challenges	Tiered Content Materials: Simplified versions of texts with key concepts highlighted Audio versions of texts for auditory learners or struggling readers Leveled or topical readers at different reading levels Books on tape Highlighted text Collaborative Learning Tools: Opportunity to work alone, in pairs, or small groups Structured group roles for small group work Peer tutoring and mentoring programs Individualized Options: Independent study options Compacting the curriculum for advanced learners Varied timelines or check-in points Choice of review activities ESL-Specific Resources: Bilingual dictionaries or glossaries	Keep material concept-focused and principle-driven. Allow the use of digital translation or grouping students together. Provide multiple means of action and expression.	Advanced Learning Resources: ASE Certification Prep – Encourage study for industry-recognized certifications. OEM Service Manuals – Provide access to detailed manufacturer repair guides. Automotive Engineering Textbooks – Explore advanced concepts like hybrid systems and aerodynamics. Online Training & Webinars – Use resources from ASE, Snap-On, and major manufacturers. 3D Modeling & Diagnostic Simulations – Utilize software for digital learning. Hands-On Activities: Advanced Diagnostics & Troubleshooting – Solve complex real-world car issues. Engine Teardown & Rebuild – Fully disassemble and reassemble an engine. Performance Tuning & Fabrication – Work with ECU tuning and custom modifications.

	Sentence frames and language scaffolds Visual supports for key vocabulary		Internship/Job Shadowing – Partner with local shops for real-world experience. Competitive Automotive Events – Participate in SkillsUSA or vehicle design competitions. Enrichment & Leadership: Student-Led Research & Presentations – Explore future automotive trends.

Supplemental Resources

Technology:

- Laptop
- Chromebook
- SmartBoard
- Internet Access
- Projector

Differentiated Student Access to Content:
Recommended *Strategies & Techniques*

Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
Content Differentiation: Tiered content at different complexity levels Variety of textbooks at different reading levels	Content Differentiation: Simplified versions of texts with key concepts highlighted Audio versions of texts for auditory learners or struggling readers	Content Differentiation: Simplified versions of texts with key concepts highlighted Audio versions of texts for auditory learners	Content Differentiation: Advanced, above-grade level textbooks and materials Supplementary resources on complex or specialized topics

Supplemental materials like videos, podcasts, and interactive modules Compacting curriculum for advanced learners Choice boards allowing students to select learning activities Varied resources/texts on the same topic Process Differentiation: Flexible grouping (whole group, small group, individual) Learning contracts tailored to student needs Interest centers focused on different aspects of a topic Varied instructional strategies (visual, auditory, kinesthetic) Scaffolded support like graphic organizers and writing frames Technology-enabled instruction (synchronous or asynchronous options) Product Differentiation: Multiple options for demonstrating learning (reports, presentations, models, etc.) Varied assessment methods based on student learning preferences Adjusting product expectations based on student readiness	Leveled readers at different reading levels Bilingual materials for ESL students Visual aids, infographics, and multimedia resources Process Differentiation: Flexible grouping based on readiness levels Scaffolded support like graphic organizers and writing frames Extended time for task completion One-on-one or small group instruction Use of assistive technology (text-to-speech, speech-to-text tools) Product Differentiation: Multiple options for demonstrating learning (oral presentations, projects, etc.) Adjusted expectations based on IEP/504 goals Alternative assessments aligned with student abilities Use of portfolios to showcase progress over time	Leveled readers at different reading levels Bilingual materials and resources1 Visual aids, infographics, and multimedia resources Modified texts with rewording, reduced extraneous information, and added visuals Process Differentiation: Flexible grouping based on language proficiency levels Scaffolded support like graphic organizers and writing frames Extended time for task completion One-on-one or small group instruction Use of gestures and total physical response to support verbal instruction Incorporation of students' native language or culture when possible Product Differentiation: Multiple options for demonstrating learning (oral presentations, projects, etc.) Adjusted expectations based on English proficiency levels Alternative assessments aligned with student abilities	Interdisciplinary curriculum connecting multiple subject areas Primary source documents and advanced readings Access to college-level coursework or materials Process Differentiation: Accelerated pacing of instruction Independent study options on topics of interest Problem-based and project-based learning opportunities Socratic seminars and philosophical discussions Mentorship programs with experts in fields of interest Product Differentiation: Open-ended, creative project options Real-world application of learning through authentic tasks Opportunities for original research and experimentation Multimedia presentations and publications Portfolio development to showcase depth of learning

Learning Environment Differentiation: Flexible seating arrangements Options for individual, paired, or group work Varied time allocations for task completion Use of technology to support different learning needs	Learning Environment Differentiation: Flexible seating arrangements Quiet spaces for individual work Sensory tools or fidgets as needed Visual schedules and routines Specialized Supports Implementation of IEP accommodations and modifications ESL supports like sentence frames and vocabulary guides Interventions for at-risk students (e.g. reading interventions) Social-emotional learning supports Ongoing Assessment Frequent formative assessments to monitor progress Data-driven adjustments to instruction Progress monitoring aligned with IEP goals	Use of portfolios to showcase progress over time Learning Environment Differentiation: Flexible seating arrangements Use of learning centers or stations focused on different aspects of a topic Visual schedules and routines Incorporation of culturally relevant materials and examples Specialized Supports: ESL supports like sentence frames and vocabulary guides Use of students' native language for clarification when needed Frequent opportunities for speaking and listening practice Integration of all four language skills (listening, speaking, reading, writing) Instructional Strategies: Slowing down speech and using clear enunciation Rephrasing and clarifying instructions Using visuals to support verbal instruction Providing content in multiple formats (visual, auditory, kinesthetic)	Learning Environment Differentiation: Flexible grouping with intellectual peers Access to advanced technology and lab equipment Field trips and off-campus learning experiences Online courses and virtual learning options Competitions and academic challenges Specialized Supports: Critical and creative thinking skill development Training in research methods and academic writing Guidance on social-emotional needs of gifted learners College and career planning tailored to advanced learners Opportunities to explore passions and develop talents Instructional Strategies: Inquiry-based and discovery learning approaches

		Connecting content to students' interests and cultural backgrounds Utilizing music, melodies, or songs to enhance learning Ongoing Assessment: Frequent formative assessments to monitor progress Data-driven adjustments to instruction Accommodated assessments (e.g., simplified language, added visuals)	Higher-order questioning techniques Abstract and complex problem-solving tasks Emphasis on depth and complexity of content Integration of multiple disciplines and perspectives Assessment Options: Pre-assessments to determine readiness levels Performance-based and authentic assessments Self-assessment and reflection opportunities Above-grade level standardized testing Credit by examination options

Work-Based Learning Experiences (WBL)- *Previously called Structured Learning Experience (SLE)

Each course within a CTE program is now required to include at least one WBL each year.

Work-Based Learning: Sustained, meaningful interactions with industry or community professionals that foster in-depth, firsthand engagement with the tasks required in a given career field. Experiences may be delivered in workplaces, in the community, at educational institutions, and/or virtually. WBL is aligned with national, state, and/or local standards. WBL develops and reinforces relevant technical, academic, and employability knowledge and skills.

WBL Integration/Activity:	Duration:	Brief description of activities:
Career Fair	1-3 day Event	• Annual School wide Career Fairs with various presentation in the Architecture and Constructions fields
Guest Speakers	1-2 hour a couple times throughout the year	• Guest Speakers
Career Related Competitions	Throughout the Marking Period	• Service Learning & Career Related Competitions such as SkillsUSA
Internships (Paid or non-paid)	Summer Internships	• Internship Opportunities
Informational Interviews /Guest Speakers	1-3 day Event	• Annual STEAM Day
Pre- Apprenticeship	Summer long	• Apprenticeship programs
Career Related Competitions	1-3 day Event	• SkillsUSA Competitions
Interactive/Hands-on Demonstrations with industry Professionals (online, in-person)	30-1hr per student throughout the year or one day	• (Online or in-person) Portfolio Critiques, Project Critiques with Industry professionals
Simulated Workbased Experience	Afterschool year long	• Simulated Workbased Experience
WBL Partners:		
Career and Technical Student Organization- *Every CTE program must incorporate a Career and Technical Student Organization (CTSO).		

Content Area: Career Readiness, Life Literacies, and Key Skills (NJSLS-CLKS 9.2, 9.3, 9.4) Grades K - 12
Grade: 10

Dev. Date:

CTSO:	**CTSO Advisor:**	
ACE Mentorship Program		ACE Mentor Program is an after-school program whose mission is to engage, excite and enlighten high school students to pursue careers in Architecture, Construction, and Engineering through mentoring and to support their continued advancement in the industry.

Freshman Level: Approximately 10 hours Career Awareness- brief exposure to a variety of work settings needs.	**Sophomore Level: Approximately 20 hours** Career Exploration- understand the nature of work through first-hand exposure to the workplace.	**Junior Level: Approximately 50 hours** Career Preparation - builds basic workplace competence	**Senior Level: Approximately 75 hours** Work-Related Training - a period of work experience for the purpose of training job skills and job-related skills. work experience Students may or may not be paid.
Career fair Guest Speakers Online Career Navigation, Assessments, Videos Informational Interviews Workplace Tours/Field Trips	Informational interviews Job shadowing Workplace tours/worksite visits Simulated Workplace Experience Mock Interviews	Service-learning Interactive/Hands-on demonstrations with industry prof. (online, in person, simulated) Career Cluster Employer Panel Presentations Structured Assignments after a workplace tour, presentation, shadowing Career Related Competitions School-based enterprises Simulated Workplace Experience Non-Paid Work Experience Service Learning/Volunteering	Internships (Paid or Non-Paid) Service Learning Student-led Enterprises Volunteering Work Experience (Paid or Non-Paid) Pre-Apprenticeships Apprenticeship

New Jersey Legislative Statutes and Administrative Code
(place an "X" before each law/statute if/when present within the curriculum map)

	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*		Erin's Law: *A-769/S-1130*