Grade 5

Unit 1: Engineering and Technology

New Jersey Student Learning Standards
2024 - 2025

Established 2016-2017
Revised 2018-2019
Revised 2019-2020
Revised 2020-2021
Revised 2022-2023
Revised 2023-2024
Revised 2024-2025

Trimester	Unit Title	Recommended Instructional Days
1	Engineering and Technology	20

NJSLS - Science: *TItle*	NJSLS - Science: *Performance Expectations*	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit
3-5-ETS1 Engineering Design	**3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	
FOUNDATION Disciplinary: *Core Idea*	**FOUNDATION Disciplinary: *Statement***	
ETS1.A: Defining and Delimiting Engineering Problems **ETS1.B: Developing Possible Solutions** **ETS1.C: Optimizing the Design Solution**	● Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well	**Essential Question/s:** ● What is the best way to perform a safe science investigation? ● How are engineering, technology, science and society interconnected? **Enduring Understanding:** ● Understand, evaluate and practice safe procedures for conducting science investigations.

DCI.5-PS1.A: Structure and Properties of Matter	each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1) ● Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2) ● At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2) ● Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3) ● Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3) ● Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gasses are made from matter particles that are too small to see and are moving freely around in space can explain many	● Explore how people study, interact with, and manage technology. ● Revisit and practice the engineering design process to define problems and build, test, evaluate and optimize solutions to those problems. ● Use evidence to support a claim that engineers use a systematic approach to design and improve technology to meet people's wants and needs which change over time. **Activity Description**: **Science Safety Activities** - Discuss Science Safety in Lab, Safety in the Field and Safety Symbols. (SCI) **Lab Activities** ● *Unit Project - Dropping Off, Picking Up* - Students will ask questions and define problems in order to redesign a school entranceway. (SCI, TECH, MA, ART) ● *Hands-On Activity 1 - What Makes a Good Toy Car?*: Before designing a car, engineers seek to understand what matters in a good car. (SCI, MA, ART) ● *Hands-On Activity 2 - Improving Toy Cars*: Engineers improve existing car solutions according to clear priorities. (SCI, MA, ART) ● *You Solve It - Cat in Tree* - Students will design a scratching post for cats and optimize their solutions to better meet criteria and constraints. (SCI, TECH, MA) **Performance Task** ● *Lunch Line Life Hack* - Students design a lunch line that moves faster. (SCI, MA, ART) **Research Task** ● *Safety Survey* - Students work with partners or in small teams of mixed ability to develop a list of safety criteria for cars. They then research online the types of safety checks that automobile manufacturers perform on their cars. See whether students found a lot of the same answers. (SCI, ELA, TECH)

	observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. (5-PS1-1) ● The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2) ● Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensations.) (5-PS1-3) ● When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)	**Career Education** ● Safety Engineer - Students learn about the roles of safety engineers in keeping technologies safe. People in Science & Engineering: Research Katherine Johnson. You may know of Katherine Johnson from the film *Hidden Figures*. Her work as a mathematician and "human computer" was critical to the success of the NASA US Space Programme in the 1950s. **(Amistad Law / Diversity & Inclusion)** **Interdisciplinary Connections: Content: ;NJSLS#:** ***ELA/Literacy*** **RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (3-5-ETS1-2) **RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (3-5- ETS1-2) **RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (3-5-ETS1-2) **W.5.7** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (3-5-ETS1-1),(3-5-ETS1-3) **W.5.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (3-5-ETS1-1),(3-5-ETS1-3) **W.5.9** Draw evidence from literary or informational texts to support analysis, reflection, and research. (3-5-ETS1-1),(3-5-ETS1-3)
FOUNDATION **Science and Engineering Practices:** ***Core Idea***	**FOUNDATION** **Science and Engineering Practices:** ***Statement***	
Asking Questions and Defining Problems **Planning and Carrying Out Investigations**	● Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.	

Constructing Explanations and Designing Solutions	• Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1) • Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3) • Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing	***Mathematics*** **MP.2** Reason abstractly and quantitatively. (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3) **MP.4** Model with mathematics. (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3) **MP.5** Use appropriate tools strategically. (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3) **3-5.OA** Operations and Algebraic Thinking (3-5-ETS1-1),(3-5-ETS1-2)

	multiple solutions to design problems. ● Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)	
FOUNDATION **Crosscutting Concepts:** ***Core Idea***	**FOUNDATION** **Crosscutting Concepts:** ***Statement***	
Influence of Engineering, Technology, and Science on Society and the Natural World	● People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1) ● Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)	
Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***	
Self-Awareness **Self-Management**	● Recognize one's feelings and thoughts ● Recognize the impact of one's feelings and thoughts on one's own behavior	

Social Awareness **Responsible** **Decision-Making** **Relationship Skills**	• Recognize one's personal traits, strengths, and limitations • Recognize the importance of self-confidence in handling daily tasks and challenges • 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. • Recognize and identify the thoughts, feelings, and perspectives of others. • Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds	

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: • Diagnostic tests used to modify teaching and learning activities to improve student attainment (Unit Readiness Check, Lesson Quiz, Unit Test, Performance-Based Assessment, Safety Quiz)	**Benchmarks:** • District Assessments **Summative Assessments:** • End of Unit/Chapter Test
Differentiated Student Access to Content: **Teaching and Learning *Resources/Materials***	

Core Resources	Alternate Core Resources *IEP/504/At-Risk/ESL*	ML Core Resources	Gifted & Talented Core Resources
• Evidence Notebook • Equipment Kit • FUNomental Readers • Idea Organizer • Language Development Worksheet • Online Simulations • Into Science TE • Into Science SE • District Approved Resources	• FUNomental Readers • Multilingual Glossary	• FUNomental Readers • Multilingual Glossary • Multilingual Home Letters	• FUNomental Readers

Supplemental Resources

Technology:
- Chromebook
- SMARTBoard / Promethean Board
- District-Approved Resources

Ed Science Platforms:
- Digital Assessments
- Digital Performance Tasks
- You Solve It Simulation
- Student eBook
- Video-Based Projects
- Science Tools
- Online Glossary

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

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

• Model how to identify vocabulary terms within text. Discuss how to locate definition within the text, noting that some definitions will need to be inferred based on images as well as text.	• Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake tests for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.	• Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.	• Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect students to related talent development opportunities.

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept:** Critical Thinking & Problem-Solving	
	Core Ideas:	The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
	Performance Expectation/s:	• 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). • 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1). • 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems. • 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and

		global (e.g., 6.1.5.CivicsCM.3).
	Career Readiness, Life Literacies, & Key Skills Practices	
	Students work in cooperative groups and will use research strategies to complete labs	

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*		Holocaust Law: *N.J.S.A. 18A:35-28*		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*