Dev. Date:
Established 2016-2017
Revised 2018-2019
Revised 2019-2020
Revised 2020-2021
Revised 2021-2022
Revised 2022-2023

Grade 4

Unit 1 Engineering and Technology

New Jersey Learning Standards

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

Content Area: Science (NJSLS-S) Grades K - 12
Grade: 4

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Trimester	**Unit Title**	**Recommended Instructional Days**
Trimester 1	Engineering and Technology (Including Safety Review xvii-xx)	15

NJSLS - Science: ***TItle***	**NJSLS - Science:** ***Performance Expectations***	**Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-S within Unit**
Engineering Design	• **3-5-ETS1-1** Define a simple design problem reflecting a need or want that includes specific criteria for success and constraints on materials, time, or cost. • **3-5-ETSI-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-ETSI-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.	

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FOUNDATION Disciplinary: ***Core Idea***	**FOUNDATION Disciplinary:** ***Statement***	
• **ETSI.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 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, such as climate change, 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)	**Essential Question/s:** • What is engineering? • How do engineers design solutions? • How do engineers test and improve prototypes? **Activity Description:** • Review Safety in the Lab, Safety in the Field, and Safety Symbols [SCI] • You Solve It- Keeping it Warm and Cool (Online Simulation) [SCI, Climate Change, 21st Century, TECH] • Hands-On Activity: Quick Tower Building [SCI, PE] • Hands-On Activity: Designing a Listening Device [SCI, SEL, 21st Century, ART, TECH, PE] • Unit Project- Extend a Sense [SCI, 21st Century, ELA] • Unit Performance Task- Engineer It! Designing a Portable Chair [SCI, ELA, 21st Century, ART, TECH, PE] • Scientist Spotlight- Ralph Braun, George Washington Carver, Lonnie Johnson, and Madam C.J. Walker. [SCI, 21st Century, TECH]

	• 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)	**Interdisciplinary Connections: Content: NJSLS:** *Connections to NJSLS - English Language Arts* • **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) *Connections to NJSLS - 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)
FOUNDATION **Science and Engineering Practices:** ***Core Idea***	**FOUNDATION** **Science and Engineering Practices:** ***Statement***	
• **Asking Questions and Defining Problems** Asking questions and defining problems in 3–5 builds on grades K–2 experiences and	• Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several	

progresses to specifying qualitative relationships. ● **Planning and Carrying Out Investigations** 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. ● **Constructing Explanations and Designing Solutions** 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 multiple solutions to design problems.	criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1) ● 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) ● 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)	• **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)

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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***	
● Responsible Decision-Making ● Relationship Skills	● 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.	

	• 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: • Diagnostic tests, Unit Pretest, Lesson Check, Lesson Quiz, Safety Quiz, and student responses in Ebook.	**Benchmarks:** • District Assessment **Summative Assessments:** • Unit 1 Performance Task- Designing a Portable Chair • Unit 1 Project- Extend a Sense • Unit 1 Test

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**
• HMH Workbook • HMH Into Science Kits • Student Chromebooks • Video Based Projects for each Unit	• Text to Speech Tool on HMH E-Book • Read-Along Highlight Tool on HMH E-Book • Leveled Readers • Language Development Worksheet for each unit	• Multilingual Glossary on HMH Ed website	• Leveled Readers • You Solve It Simulations

Supplemental Resources			
Technology: ● HMH E-Book ● Schoology ● Kahoot! ● Quizlet/Quizlet Live ● Quizizz ● Readworks ● Mystery Science ● NSTA Lesson Resource-Engineering Design ● You Solve it Simulations **Other:** ● Leveled Readers			
Differentiated Student Access to Content: **Recommended *Strategies & Techniques***			
Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
● Promote an approach that benefits multiple learning styles exploring phenomena through readings, videos, and collaborative projects. ● Establishing proper safety protocols for gathering materials	● 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	● 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,	● 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

and using specialized equipment. ● Establishing communication protocols for collaborative activities to ensure all students properly communicate and involve every student. ● Demonstrate that the Engineering Design Process is a flexible cycle that allows for steps to be repeated.	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.	and modified assessment and/or rubric.	talent development opportunities.

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept:**	
	Core Ideas:	● Collaboration with individuals with diverse perspectives can result in new ways of thinking and/or innovative solutions. ● Curiosity and a willingness to try new ideas (intellectual risk-taking) contributes to the development of creativity and innovation skills. ● The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
	Performance Expectation/s:	● 9.4.5.CI.1: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6). ● 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate

		change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7). ● 9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a). ● 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6). ● 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.Civics CM.3).
	Career Readiness, Life Literacies, & Key Skills Practices	
	● Hands-on activities provide opportunities for creativity and innovation. Working in small groups will allow students to collaborate with classmates who possess diverse perspectives for innovative solutions. Also, collaboration will enhance their ability to gather data, discover resources, and apply critical thinking skills to solve real-world problems.	

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*		X Standards in Action: *Climate Change*