

Grade 1

Unit 1: Engineering Design Process

New Jersey Student Learning Standards

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

Marking Period	Unit Title	Recommended Instructional Days
Trimester 1	Engineering Design Process	12 - 15 days
NJSL - Science: <i>Title</i>	NJSL - Science: <i>Performance Expectations</i>	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSL-S within Unit
Engineering Design	<ul style="list-style-type: none"> ● K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. ● K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. ● K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. 	
FOUNDATION Disciplinary: Core Idea	FOUNDATION Disciplinary: Statement	
<ul style="list-style-type: none"> ● K-2-ETS1.A: Defining and Delimiting Engineering Problems ● K-2-ETS1.B: Developing Possible Solutions ● K-2-ETS1.C: Optimizing the Design Solution 	<ul style="list-style-type: none"> ● asking questions, making observations, and gathering information help in thinking about problems to be solved ● designs can be conveyed through sketches, drawings, and physical models ● there is always more than one possible solution; compare and test designs 	<p>Essential Question/s:</p> <ul style="list-style-type: none"> ● What are the procedures and rules to ensure science safety? ● What is the Engineering Design Process? ● How can I use the steps of a design process in order to define problems and plan solutions to problems? ● How is the structure of an object connected to how the object works? <p>Activity Description:</p> <ul style="list-style-type: none"> ● Understand the procedures and rules for science safety

<p>FOUNDATION Science and Engineering Practices: <i>Core Idea</i></p>	<p>FOUNDATION Science and Engineering Practices: <i>Statement</i></p>	<ul style="list-style-type: none"> Define a problem, develop a model for a solution, and test a solution Analyze the connection between the structure of an object and how it works
<ul style="list-style-type: none"> Asking Questions and Defining Problems Developing and Using Models Analyzing and Interpreting Data 	<ul style="list-style-type: none"> ask questions about the world; define a problem that can be solved with a tool or object develop a simple model based on evidence analyze data to determine if an object or tool works as intended 	<p>Interdisciplinary Connections: Connections to Math:</p> <ul style="list-style-type: none"> 1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
<p>FOUNDATION Crosscutting Concepts: <i>Core Idea</i></p>	<p>FOUNDATION Crosscutting Concepts: <i>Statement</i></p>	<p>Connections to ELA:</p>
<ul style="list-style-type: none"> Structure and Function 	<ul style="list-style-type: none"> shape and stability of objects' structures are related to their function 	<ul style="list-style-type: none"> SL.1.5 Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.
<p>Social and Emotional Learning: <i>Competencies</i></p>	<p>Social and Emotional Learning: <i>Sub-Competencies</i></p>	
<ul style="list-style-type: none"> Responsible Decision-Making Relationship Skills Self-Management Social Awareness Self Awareness 	<ul style="list-style-type: none"> Develop, implement, and model effective problem-solving and critical thinking skills Utilize positive communication and social skills to interact effectively with others Recognize the skills needed to establish and achieve personal and educational goals 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 ways. Recognize the importance of self-confidence in handling daily tasks and challenges. 	

Assessments (Formative) <i>To show evidence of meeting the standard/s, students will successfully engage within:</i>		Assessments (Summative) <i>To show evidence of meeting the standard/s, students will successfully complete:</i>	
Formative Assessments: <ul style="list-style-type: none">Lesson Check		Benchmarks/Summative Assessments: <ul style="list-style-type: none">Unit TestPerformance Based Assessment	
Differentiated Student Access to Content: Teaching and Learning Resources/Materials			
Core Resources	Alternate Core Resources <i>IEP/504/At-Risk/ESL</i>	ELL Core Resources	Gifted & Talented Core Resources
<ul style="list-style-type: none"> Workbook Leveled Readers Hands-on Activities Interactive Worktext 	<ul style="list-style-type: none"> 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 Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.
Supplemental Resources			
Technology: <ul style="list-style-type: none"> <i>Marshmallow Launcher - define a problem about launching a marshmallow as far as possible; test designs to optimize the best solution</i> <i>Pocket Lock-It - design a solution to keep objects from falling out of a pocket. Plan and test solutions and then analyze data from their tests</i> <i>Build a House - build two solutions and do tests to determine which materials will keep a model house from blowing down</i> 			

<p>Other:</p> <ul style="list-style-type: none"> ● <i>Math - Represent Data</i> ● <i>ELA - Use Visuals</i> ● <i>Social Studies</i> <ul style="list-style-type: none"> ○ <i>People in Science & Engineering: Lynn Conway</i> ○ <i>Careers in Science & Engineering: Packaging Engineer</i> 			
<p>Differentiated Student Access to Content: Recommended Strategies & Techniques</p>			
Core Resources	Alternate Core Resources <i>IEP/504/At-Risk/ESL</i>	ELL Core Resources	Gifted & Talented Core
<ul style="list-style-type: none"> ● Large group instruction ● Small group instruction ● Think Pair Share ● Cooperative group work ● Multimedia presentations ● K-W-L ● Manipulatives ● Leveled Readers 	<ul style="list-style-type: none"> ● 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 ● Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed. 	<ul style="list-style-type: none"> ● 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. 	<ul style="list-style-type: none"> ● 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: Creativity & Innovation/Critical Thinking & Problem Solving / Technology Literacy	
	Core Ideas:	<ul style="list-style-type: none"> Brainstorming can create new, innovative ideas. Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem. Collaboration can simplify the work an individual has to do and sometimes produce a better product.
	Performance Expectation/s:	<ul style="list-style-type: none"> 9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2). 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a). 9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2). 9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3). 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive). 9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts (e.g., W.2.6., 8.2.2.ED.2).
	Career Readiness, Life Literacies & Key Skill Practices	
	<ul style="list-style-type: none"> Demonstrate creativity and innovation. Utilize critical thinking to make sense of problems and persevere in solving them. Use technology to enhance productivity, increase collaboration and communicate effectively. Work productively in teams while using cultural/global competence. 	

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

Amistad Law: <i>N.J.S.A. 18A 52:16A-88</i>		Holocaust Law: <i>N.J.S.A. 18A:35-28</i>		LGBT and Disabilities Law: <i>N.J.S.A. 18A:35-4.35</i>		Diversity & Inclusion: <i>N.J.S.A. 18A:35-4.36a</i>		Standards in Action: <i>Climate Change</i>
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Content Area: Science (NJSL-S) Grades K - 12
Grade: 1

Dev. Date:
2024-2025
