

Grade 2

Unit 1: The Design Process

New Jersey Student Learning Standards

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

Trimester	Unit Title	Recommended Instructional Days
One	Engineering Design Process	22 - 26 days
NJSLS - Science: Title	NJSLS - Science: Performance Expectations	Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSL-S within Unit
Engineering Design	<p>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.</p> <p>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.</p> <p>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</p>	
FOUNDATION Disciplinary: Core Idea	FOUNDATION Disciplinary: Statement	
<ul style="list-style-type: none"> ● ETS1.A: Defining and Delimiting Engineering Problems ● ETS1.B: Developing Possible Solutions 	<ul style="list-style-type: none"> ● A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1); Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1); Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) ● Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other 	<p>Essential Question/s:</p> <ul style="list-style-type: none"> ● Why do you need to understand safe procedures in the science classroom and laboratory? ● How do you practice safe procedures in the science classroom and laboratory? ● What is a design process? ● How can we compare design solutions? ● What are the steps of a design process? ● What evidence can you observe to show that a solution is effective? <p>Activity Description:</p> <ul style="list-style-type: none"> ● Understand, evaluate and practice safe procedures for conducting science investigations. ● Ask questions, make observations, and gather information to define a problem.

<ul style="list-style-type: none"> ETS1.C: Optimizing the Design Solution 	<p>people. (K-2-ETS1-2)</p> <ul style="list-style-type: none"> Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3) 	<ul style="list-style-type: none"> Use a design process to solve a problem. Compare the strengths and weaknesses of multiple design solutions <p><i>Suggested Activities:</i> <u>Unit Phenomenon</u></p>
<p align="center">FOUNDATION Science and Engineering Practices: Core Idea</p>	<p align="center">FOUNDATION Science and Engineering Practices: Statement</p>	<ul style="list-style-type: none"> Runaway Wagon (Unit 1 Project) DCI ETS1.A Defining and Delimiting Engineering Problems; DCI ETS1.B Developing Possible Solutions; DCI ETS1.C Optimizing the Design Solution
<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"> Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions. <ul style="list-style-type: none"> Ask questions based on observations to find more information about the natural and/or designed world(s). (K2-ETS1-1) Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2- ETS1-1) Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or story board) that represent concrete events or design solutions. <ul style="list-style-type: none"> Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2) Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. <ul style="list-style-type: none"> Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3) 	<ul style="list-style-type: none"> How Was It Made? Can You Solve It? Build a Better Lunchbox, Take it Further (Make Your Lunchbox Better) Asking Questions and Defining Problems; Developing Possible Solutions; Developing and Using Models; Build a Water Bottle Holder (Unit 1 Performance Task) Developing Possible Solutions, Do the Math! Make a Bar Graph, One Problem, Many Solutions, Build and Test a Solution, Compare Strengths and Weaknesses of Design Solutions Analyzing and Interpreting Data, Developing Possible Solutions; Blast to the Past (explore online) Science Safety Activities - Discuss Science Safety. (pgs: xv-xvi) <p><i>*Collaboration opportunities in this unit: Build on Prior Knowledge (pp. 5, 21), Think, Pair, Share (p.22), Cultivating New Questions (pp. 17, 31), Small Groups (p. 16)</i></p> <p>Interdisciplinary Connections: Connections to Math MP.2: Reason abstractly and quantitatively MP.4: Model with mathematics MP.5: Use appropriate tools strategically 2.MD.D.10: Draw a picture graph and a bar graph (with single unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and</p>

		compare problems using information presented in a bar graph.
FOUNDATION Crosscutting Concepts: <i>Core Idea</i>	FOUNDATION Crosscutting Concepts: <i>Statement</i>	<p>Connections to Language Arts</p> <p>RI.2.1 Ask and answer such questions as... understanding of key details in a text</p> <p>W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including collaboration with peers.</p> <p>W.2.8: Recall information from experiences or gather information from provided sources to answer a question.</p> <p>SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings</p>
<ul style="list-style-type: none"> Structure and Function 	<ul style="list-style-type: none"> The shape and stability of structures of natural and designed objects are related to their function(s). (K-2- ETS1-2) 	
Social and Emotional Learning: <i>Competencies</i>	Social and Emotional Learning: <i>Sub-Competencies</i>	
<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>
<p>Formative Assessments:</p> <ul style="list-style-type: none"> Interactive worktext (Performance Task pp. 34-35), Apply What You Know, Lesson Check, Evidence Notebook 		<p>Benchmarks:</p> <ul style="list-style-type: none"> - Performance-Based Assessment (End of Module Test/End of Year Test), District Assessments <i>Alternative</i> - Performance Assessment (back of assessment guide), Unit Project, You Solve It (Digital only)

		<p>Summative Assessments:</p> <ul style="list-style-type: none"> Lesson quiz, Interactive Worktext (Unit 1 Review pp. 36-38), Self Check, Unit Test 	
<p>Differentiated Student Access to Content: Teaching and Learning Resources/Materials</p>			
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.
<p>Supplemental Resources</p>			
<p>Technology:</p> <ul style="list-style-type: none"> HMH Co. Interactive Site You Solve It Simulations 			

Other:
Career Education: Mechanical Engineer, Structural Engineer
Spotlight On Scientist: Gustave Eiffel & Granville Tailer Woods

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

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:	
	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 Skills 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)

x	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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