Grade 6

Engineering and Science Module A

New Jersey Student Learning Standards

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

Marking Period	Unit Title	Recommended Instructional Days	
1	Engineering and Science	45 Days (Includes Lab Safety Skills and Procedures)	
NJSLS - Science: <i>Title</i>	NJSLS - Science: Performance Expectations	ities, Investigations, ections, and/or Student NJSLS-S within Unit	
Engineering Design	 MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design 	 Essential Question/s: How are science and mage What is the design procession How does technology a Why do engineers and or products used in our date Why do we use the engineers of the engineer of the engineer	ath used in engineering? ess? ffect society? designers strive to improve ily lives? ineering design process to ? ag design process benefit us our daily lives? ab, Safety in the Field, and xiv-xvi) <u>E Model</u> nenon, Can You Explain it? Is on Lab, Engineer It her, Careers in Science Check

	solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	 Lab and engineering activities will incorporate these skills: Planning and Organization Critical Thinking Communication in a group Decision Making Reflection on activity and participation Spotlight on scientists and their accomplishments: Ex. Leonardo Da Vinci - Inventor "Do You See Yourself as a Scientist?" Mae Carol Jemison- Astronaut/ Engineer
FOUNDATION Disciplinary: <i>Core Idea</i>	FOUNDATION Disciplinary: Statement	Human Impacts on the Earth: Explore how the advancement in technology has had positive and negative effects on our earth (pollution use of resources, carbon
ETS1.A: Defining and Delimiting Engineering Problems	The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1)	 footprint) Book A Unit 1 Lesson 2 Systems and System Models Model a Home Heating System <u>Interdisciplinary Connection: Content: (NJSLS#)</u> <u>Connections to Math:</u> Model with mathematics. (MP.4) Summarize numerical data sets in relation to their context. (6.SP.B.5)
ETS1.B: Developing Possible	A solution needs to be tested,	

Solutions	 and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4) There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.(MS-ETS1-2), (MS-ETS1-3) Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3) Models of all kinds are important for testing solutions. (MS-ETS1-4) 	 Connections to Language Arts: Cite specific textual evidence to support analysis of science and technical texts. (RST.6-8.1) Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. (RST.6-8.4) Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (RST.6-8.7) Integrate multimedia and visual displays into presentations to clarify information, strengthen claims evidence, and add interest. (SL.8.5)
ETS1.C: Optimizing the Design Solution	Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those	

	characteristics may be incorporated into the new design. (MS-ETS1-3) The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (MS-ETS1-4)
FOUNDATION Science and Engineering Practices: <i>Core Idea</i>	FOUNDATION Science and Engineering Practices: <i>Statement</i>
Asking Questions and Defining Problems	Asking questions and defining
	problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.

on Society and the Natural World	short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ETS1-1) The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-ETS1-1)	
Social and Emotional Learning: <i>Competencies</i>	Social and Emotional Learning: Sub-Competencies	
Responsible Decision-Making Relationship Skills	 Develop, implement, and model effective problem-solving and critical thinking skills Utilize positive communication and social skills to interact 	
	i enectively with others	

Social Awareness	 Recognize the skills needed to establish and and achieve personal and educational goals Demonstrate an understanding of the need for mutual respect when 			
Self Awareness	 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 To show evidence of meeting the st engage	s (Formative) tandard/s, students will successfully 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 		 Benchmarks: District Assessment Summative Assessments: End of unit/chapter tests/lesson quizzes and lab safety skills test 		
Differentiated Student Access to Content: Teaching and Learning <i>Resources/Materials</i>				

Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core Resources			
 Interactive Worktext Equipment Kits Online Simulations Evidence Notebook Lab Safety Handbook CK 12 Virtual Labs Hands on Labs Online Science Tools (Scientific Calculator, Graphing) BrainPop Science IXL Science 	 Multilingual Glossary Sciencesaurus Online Science Tools (Scientific Calculator, Graphing) BrainPopEspanol 	 Multilingual Glossary Sciencesaurus Online Science Tools (Scientific Calculator, Graphing) Brain Pop ELL 	 Online Simulations CK 12 Virtual Labs Webquests PHET Video-Based Projects Take It Further You Solve It! Unit Performance Tasks Unit Projects Online Science Tools (Scientific Calculator, Graphing) BrainPop Science IXL Science 			
Supplemental Resources						
 Technology: 8.1.8.A.1, 8.1.8.A. 2, 8.1.8.A.3, 8.1.8.A. 4, 8.1.8.A. 5 Other: CRP4 Communicate clearly and effectively and with reason. CRP6 Demonstrate creativity and innovation 						

Content Area: Science (NJSLS-S) Grades K - 12 Grade: 6

- CRP7 Employ valid and reliable research strategies
- CRP11 Use technology to enhance productivity

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				
 Large group instruction Small group instruction Think Pair Share Peer editing Cooperative group work Multimedia presentations Manipulatives Choice Boards/Learning Menus 	• 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 test 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 student to related talent development opportunities.				

	Disciplinary Concept: 1.Career Awareness and Planning, 2.Creativity and Innovation, 3.Critical Thinking and Problem Solving, 4.Global and Cultural Awareness 5. Digital Citizenship 6. Information and Media Literacy 7. Technology Literacy			
NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	Core Ideas:	 There are a variety of resources available to help navigate the career planning process. Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking. Multiple solutions often exist to solve a problem. Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction. Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work. Digital tools make it possible to analyze and interpret data, including text, images, and sound. These tools allow for broad concepts and data to be more effectively communicated. Some digital tools are appropriate for gathering, organizing, analyzing, and presenting information, while other types of digital tools are appropriate for creating text, visualizations, models, and communicating with others 		
	Performance Expectation/s:	 9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential. 9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., cross cultural, gender-specific, generational), and determine how the data can best be used to design multiple potential solutions (e.g., RI.7.9, 6.SP.B.5, 		

 7.1.NH.IPERS.6, 8.2.8.ETW.4). 9.4.8.CT.1: Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2). 9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal. 9.4.8.DC.1: Analyze the resource citations in online materials for proper use. 9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8). 9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations. 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4).
Career Readiness, Life Literacies, & Key Skills Practices
 Act as a responsible and contributing community member and employee. Demonstrate creativity and innovation. Utilize critical thinking to make sense of problems and persevere in solving them. Consider the environmental, social and economic impacts of decisions. 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)

Content Area: Science (NJSLS-S) Grades K - 12 Grade: 6					Dev. Date: September 2022		
X Amistad Law: N.J.S.A. 18A 52:16A-88	Holocaust Law: N.J.S.A. 18A:35-28	X	LGBT and Disabilities Law: <i>N.J.S.A.</i> <i>18A:35-4.35</i>	X	Diversity & Inclusion: N.J.S.A. 18A:35-4.36a	X	Standards in Action: <i>Climate Change</i>