

Grade 8
Trimester 1
Unit 6 Forces and Motion
Unit 7 Electric and Magnetic Forces

New Jersey Student Learning Standards

Established	2016-2017
Revised	2017-2018
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	Unit 6 Forces and Motion Unit 7 Electric and Magnetic Forces		60 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	
Motion and Stability: Forces and Interactions	<p>MS-PS2-1. Apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects.*</p> <p>MS-PS2-2. Plan an investigation to provide evidence that the change in an object’s motion depends on the sum of the forces on the object and the mass of the object.</p> <p>MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.</p> <p>MS-PS2-5. Conduct an</p>	<p><u>Essential Question/s:</u> <u>Unit 6 Forces and Motion</u></p> <ol style="list-style-type: none"> 1. What causes changes to an object’s motion? 2. How do unbalanced forces and balanced forces affect the motion of an object? 3. How are mass and acceleration related? 4. How do force pairs interact? 5. What factors affect the physical interactions between objects? <p><u>Unit 7 Electric and Magnetic Forces</u></p> <ol style="list-style-type: none"> 6. What happens to the strength of a field as we move farther away from its source or if the size of the source changes? 7. How can an object change to become magnetic? 8. What problems can be solved by applying knowledge of electromagnetism? <p><u>Activity Description:</u></p>	

	<p>investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.</p>	<ul style="list-style-type: none"> ❖ Lesson Phenomenon ❖ Unit Opener: Can you Explain it? ❖ “Take it Further” activities <p>Unit 6</p> <ul style="list-style-type: none"> ❖ Hands on Lab: Design a Phone Case ❖ Take It Further: Roller Coaster Restraints ❖ You Solve It: How can you design a safer road? ❖ Hands on Lab: Investigate Falling Objects: Air Resistance ❖ Hands on Lab: Investigate Motion and Forces ❖ Virtual Lab: Sliding Downhill <p>Unit 7</p> <ul style="list-style-type: none"> ❖ Hands on Lab: Explore the Properties of Magnets ❖ Hands on Lab: The Magnetic Force and Distance ❖ Hands on Lab: Explore Magnet Strength ❖ Hands on Lab: Explore the Electric Force ❖ Hands on Lab: You’re in Charge! ❖ Hands on Lab: Measure and Draw Fields ❖ Hands on Lab: Build an Electromagnet ❖ Virtual Lab: How Can You Change Current In Electric Circuit ❖ Virtual Lab: How Can Static Electric Charges Affect Each Other?
<p>FOUNDATION Disciplinary: <i>Core Idea</i></p>	<p>FOUNDATION Disciplinary: <i>Statement</i></p>	
<p>PS2.A Forces and Motion</p>	<p>For any pair of interacting objects, the force exerted by the first object by the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton’s third law). (MS-PS2-1)</p> <p>The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the</p>	

<p>PS2.B Types of Interactions</p>	<p>same change in motion. For any given object, a larger force causes a larger change in motion. (MS-PS2-2)</p> <p>All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must</p> <p>Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects. (MS-PS2-3)</p> <p>Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass—e.g., Earth and the sun.</p>	<p>Lab and engineering activities will incorporate these skills:</p> <ul style="list-style-type: none">● Planning and Organization● Critical Thinking● Communication in a group● Decision Making● Reflection on activity and participation <p>Spotlight on scientists and their accomplishments Examples: Sir Francis Bacon - Scientific Method Edward Bouchet- Physicist Dr. Daniel Franco - Geophysics Donnelly Williams - Roller Coaster Engineer Hedy Lamarr - Actress, Inventor Charlie Christina Martin - Racing Car Driver</p> <p>Human Impacts on Earth The Earth’s magnetic field protects us from solar radiation.</p> <p><u>Interdisciplinary Connection: Content: (NJSL#)</u></p> <p><u>Connections to Mathematics:</u></p> <ul style="list-style-type: none">● Reason abstractly and quantitatively. (MP2)● Model with mathematics. (MP4)● Understand that positive and negative numbers are used together to describe quantities having opposite
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<p>ETS1.B Developing Possible Solutions</p>	<p>Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (a charged object, or a ball, respectively). (MS-PS2-5)</p> <p>A solution needs to be tested, and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem. (secondary to MS-PS3-3)</p>	<p>directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (6.NS.C.5)</p> <ul style="list-style-type: none">• Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. (6.RP.A.3)• Write, read, and evaluate expressions in which letters stand for numbers. (6.EE.A.2)• Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. (7.NS.A.1.b)• Recognize and represent proportional relationships between quantities. (7.RP.A.2)• Solve multi-step real-life and mathematical problems posed with positive and negative rational
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		<p>numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. (7.EE.B.3)</p> <ul style="list-style-type: none">• Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. (6.RP.A.3.d) <p><u>Connections to Language Arts:</u></p> <ul style="list-style-type: none">• Cite specific textual evidence to support analysis of science and technical texts. (RST.6-8.1)• Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (flowchart, diagram, model, graph or table) (RST.6-8.7)• Write arguments focused on discipline specific content (WHST.6-8.1)• Conduct short research projects to answer questions, drawing on several sources and generating additional related, focused questions that
<p>FOUNDATION Science and Engineering Practices: <i>Core Idea</i></p>	<p>FOUNDATION Science and Engineering Practices: <i>Statement</i></p>	

<p>Planning and Carrying Out Investigations</p>	<p>Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions.</p>	<p>allow for multiple avenues of exploration (WHST.6-8.7)</p>
<p>Developing and Using Models</p>	<p>Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena design systems.</p>	
<p>Constructing Explanations and Designing Solutions</p>	<p>Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.</p>	

<p>Engaging in Argument from Evidence</p> <p>Asking Questions and Defining Problems</p>	<p>Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed worlds.</p> <p>Asking questions and defining problems in grades 6–8 builds from grades K–5 experiences and progresses to specifying relationships between variables and clarifying arguments and models.</p>	
<p>FOUNDATION Crosscutting Concepts: <i>Core Idea</i></p>	<p>FOUNDATION Crosscutting Concepts: <i>Statement</i></p>	
<p>Cause and Effect</p> <p>Systems and Systems Models</p>	<p>Cause and effect relationships may be used to predict phenomena in natural or designed systems.(MS-PS2-3), (MS-PS2-5) Models can be used to represent systems and their interactions—such as inputs,</p>	

<p>Stability and Change</p>	<p>processes and outputs—and energy and matter flows within systems.(MS-PS2-1) (MS-PS2-4)</p> <p>Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales. (MS-PS2-2)</p>	
<p>Social and Emotional Learning: <i>Competencies</i></p>	<p>Social and Emotional Learning: <i>Sub-Competencies</i></p>	
<p>Responsible Decision-Making</p> <p>Relationship Skills</p> <p>Self-Management</p>	<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 and 	

<p>Social Awareness</p> <p>Social Awareness</p>	<p>achieve personal and educational goals</p> <ul style="list-style-type: none"> ● 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 		
<p>Assessments (Formative) <i>To show evidence of meeting the standard/s, students will successfully engage within:</i></p>		<p>Assessments (Summative) <i>To show evidence of meeting the standard/s, students will successfully complete:</i></p>	
<p><u>Formative Assessments:</u></p> <ul style="list-style-type: none"> ● Diagnostic tests used to modify teaching and learning activities to improve student attainment 		<p><u>Benchmarks:</u></p> <ul style="list-style-type: none"> ● District Assessment <p><u>Summative Assessments:</u></p> <ul style="list-style-type: none"> ● End of unit/chapter tests/lesson quizzes 	
<p>Differentiated Student Access to Content: Teaching and Learning Resources/Materials</p>			
<p>Core Resources</p>	<p>Alternate Core Resources</p>	<p>ELL Core Resources</p>	<p>Gifted & Talented Core Resources</p>

	<i>IEP/504/At-Risk/ESL</i>		
<ul style="list-style-type: none"> ● Interactive Worktext ● Equipment Kits ● Online Simulations ● Lab Safety Handbook 	<ul style="list-style-type: none"> ● Multilingual Glossary ● Online Science Tools (Scientific Calculator, Graphing) 	<ul style="list-style-type: none"> ● Multilingual Glossary ● Online Science Tools (Scientific Calculator, Graphing) 	<ul style="list-style-type: none"> ● Online Simulations ● Virtual Labs ● Webquests ● Video-Based Projects ● Take It Further ● You Solve It ! ● Unit Performance Tasks ● Unit Projects ● Online Science Tools (Scientific Calculator, Graphing)
Supplemental Resources			
<p>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</p> <p>Other: Career Education</p> <ul style="list-style-type: none"> ● CRP4 Communicate clearly and effectively and with reason. ● CRP6 Demonstrate creativity and innovation ● CRP7 Employ valid and reliable research strategies ● CRP11 Use technology to enhance productivity 			
Differentiated Student Access to Content: <i>Recommended Strategies & Techniques</i>			

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

	<p>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</p>
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NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	<i>Core Ideas:</i>	<ol style="list-style-type: none"> 1. There are a variety of resources available to help navigate the career planning process. 2. Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking. 3. Multiple solutions often exist to solve a problem. 4. Awareness of and appreciation for cultural differences is critical to avoid barriers to productive and positive interaction. 5. Detailed examples exist to illustrate crediting others when incorporating their digital artifacts in one's own work. 6. 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. 7. 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
	<i>Performance Expectation/s:</i>	<ol style="list-style-type: none"> 1. 9.2.8.CAP.12: Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential. 2. 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). 3. 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). 4. 9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.

		<p>5. 9.4.8.DC.1: Analyze the resource citations in online materials for proper use.</p> <p>5. 9.4.8.DC.2: Provide appropriate citation and attribution elements when creating media products (e.g., W.6.8).</p> <p>6. 9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations.</p> <p>7. 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).</p> <p>7. 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).</p>
	<p>Career Readiness, Life Literacies, & Key Skills Practices</p>	
	<ul style="list-style-type: none"> ● 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)

X	Amistad Law: <i>N.J.S.A. 18A 52:16A-88</i>		Holocaust Law: <i>N.J.S.A. 18A:35-28</i>	X	LGBT and Disabilities Law: <i>N.J.S.A. 18A:35-4.35</i>	X	Diversity & Inclusion: <i>N.J.S.A. 18A:35-4.36a</i>	X	Standards in Action: <i>Climate Change</i>
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Content Area: Science (NJSL-S) Grades K - 12
Grade: 8

Dev. Date:
September
2024
