

Winslow Township School District
Grade 3 Science
Unit 1: Investigating Matter and Energy and
Exploring Forces and Motion

Overview: In this unit of study, students are able to determine the effects of balanced and unbalanced forces on the motion of an object. Students will investigate cause-and-effect relationships of electrical or magnetic interactions to define a simple design problem that can be solved with magnets. The concepts of patterns, cause and effect, planning, and carrying out investigations are explored.

Overview	Standards for Science	Unit Focus	Essential Questions
<p><u>Unit 1</u></p> <p>Exploring Matter and Energy in Motion</p>	<ul style="list-style-type: none"> • 3-PS2-1 • 3-PS2-2 • 3-PS2-3 • 3-PS2-4 • WIDA 1,4 	<ul style="list-style-type: none"> • Analyzing and interpreting data to make sense of phenomena using logical reasoning • Identifying cause-and-effect relationships in order to explain change • Using evidence (e.g., observations, patterns) to support an explanation 	<ul style="list-style-type: none"> • What is electricity? • What are magnets? • How is electricity and magnetism related and part of things you use every day? • How is movement caused by forces acting on an object?
<p><i>Unit 1: Enduring Understandings</i></p>	<ul style="list-style-type: none"> • Applying various amounts of force, friction and mass will affect the motion of an object. • Different types of metals, magnetic poles. Motion can be measured and described. • Motion is influenced by forces such as gravity, weight and mass. • Pushing and pulling can change the position and motion of an object. • Static electricity is an electrical charge that builds up on an object. • Current electricity is a steady stream of charges that moves through certain materials. 	<ul style="list-style-type: none"> • How do simple machines allow people to change the direction of a force? • What is work? • What are some simple machines? • How can one predict an object’s continued motion, changes in motion, or stability? • What underlying forces explain the variety of interactions observed? 	

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Curriculum Unit 1	Standards		Pacing	
			Days	Unit Days
Unit 1: Exploring Matter and Energy in Motion	3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	10	45
	3-PS2-2	Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	10	
	3-PS2-3	Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.	10	
	3-PS2-4	Define a simple design problem that can be solved by applying scientific ideas about magnets.	10	
	Assessment, Re-teach and Extension		5	

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Disciplinary Core Ideas	Indicator #	Indicator
<p>PS2.A: Forces and Motion Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object’s speed or direction of motion. (3-PS2-1) The patterns of an object’s motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (3-PS2-2)</p> <p>PS2.B: Types of Interactions Objects in contact exert forces on each other. (3-PS2-1) Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. (3-PS2-3),(3-PS2-4)</p>	3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
	3-PS2-2	Make observations and/or measurements of an object’s motion to provide evidence that a pattern can be used to predict future motion.
	3-PS2-3	Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.
	3-PS2-4	Define a simple design problem that can be solved by applying scientific ideas about magnets.

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• Assessment Plan

- Class discussions
- Independent & group work/projects
- Teacher and/or book series provided quizzes, tests, and a performance task to assess student mastery
- Homework monitor and assess class work
- Benchmark assessments
- Teacher Observations
- Performance Tasks

- Short Constructed Responses
- Observe patterns in events generated due to cause-and-effect relationships.
- Construct an argument with evidence to support a claim.
- Construct an argument with evidence that some changes caused by heating or cooling can be reversed, and some cannot. Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, or heating paper.

Resources

- Chromebooks
- HSP Science Teacher Manual
- Lab Explorations
- Big Books pg.
- Leveled Readers
- Activity book
- Vocab activities and cards
- Group discussions
- Manipulatives
- SMARTboard / Mimio Technology
- Google Applications (Documents, Forms, Spreadsheets, Presentation)
- Linkit
- Readworks website
- [NJ Department of Education](#)
- Harcourt HSP New Jersey Science textbook
- HSP Lab Manual
- HSP New Jersey Science-Teacher's Inquiry Tool Kit
- Lesson Planner Resource Pages
- Science Leveled Readers and Science Guides
- HSP Science eBook
- Chromebooks
- Anchor Charts

Activities

- [Swinging with Style](#): In this lesson, students investigate the variables that affect a pendulum's motion by riding a playground swing. Students then extend their knowledge of pendulums to engage in an engineering design challenge that involves designing timekeeping devices using human pendulums on the playground.
- [Rocket Activity 3....2....1....PUFF!](#) Students will construct small "indoor" paper rockets, determine their flight stability, and launch them by blowing air through a drinking straw. Students will then test their designs through trials, gather and analyze data, and then try to improve their rocket design to get greater distance.
- [Oil Spill Cleanup Assessment](#): Students apply their understanding of magnetic forces and designing problems to solving the real world problem of oil spills.
- ["9 Awesome Science Tricks Using Static Electricity!"](#) Video (Phenomenon): This video showcases nine static electricity phenomena that can be investigated in the classroom. The teacher could have students view any three of them to generate and investigate questions about electrical interactions between two objects not in contact with each other. The remaining phenomena could be used to have students apply their knowledge and/or extend their investigations.
- [Investigating Motion: What Causes Objects to Move?](#) In this lesson, students will be given a set of everyday objects and asked to make predictions on how far each object will move when they blow on it. They will then measure the distances the objects moved and record their data and observations in their science journals. The observations and/or measurements of the object's motion will then be applied to provide evidence of a pattern that can be used to predict future motion.

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Instructional Best Practices and Exemplars

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| <ol style="list-style-type: none"> 1. Identifying similarities and differences 2. Summarizing and note taking 3. Reinforcing effort and providing recognition 4. Homework and practice 5. Nonlinguistic representations | <ol style="list-style-type: none"> 6. Cooperative learning 7. Setting objectives and providing feedback 8. Generating and testing hypotheses 9. Cues, questions, and advance organizers 10. Manage response rates |
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9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training & 9.4 Life Literacies and Key Skills

9.2.5.CAP.4: Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.

9.4.5.CL.3: Participate in 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.CL.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.CivicsCM.3).

9.4.5.DC.4: Model safe, legal, and ethical behavior when using online or offline technology (e.g., 8.1.5.NI.2).

9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3).

9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data.

9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM.IPRET.5).

9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images graphics, or symbols.

9.4.5.TL.5: Collaborate digitally to produce an artifact (e.g., 1.2.5.CR1d).

The implementation of the 21st Century skills and standards for students of the Winslow Township District is infused in an interdisciplinary format in a variety of curriculum areas that include, English language Arts, Mathematics, School Guidance, Social Studies, Technology, Visual and Performing Arts, Science, Physical Education and Health, and World Language.

Additional opportunities to address 9.1, 9.2 & 9.4:

Philadelphia Mint

<https://www.usmint.gov/learn/kids/resources/educational-standards>

Different ways to teach Financial Literacy.

<https://www.makeuseof.com/tag/10-interactive-financial-websites-teach-kids-money-management-skills/>

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Modifications for Special Education/504

Students with special needs: The students' needs will be addressed on an individual and grade level using a variety of modalities.

Accommodations will be made for those students who need extra time to complete assignment. Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

- Small group instruction
- Audio books/ Text-to-speech platforms
- Leveled texts/Vocabulary Readers
- Leveled informational texts via online
- Modeling and guided practice
- Read directions aloud
- Repeat, rephrase and clarify directions
- Extended time as needed
- Break down assignments into smaller units
- Provide shortened assignments
- Modify testing format
- Repeat directions as needed
- Graphic organizers
- Study Guides, Study Aids and Re teaching as needed

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Modifications for At-Risk Students

Formative and summative data will be used to monitor student success. At first signs of failure, student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations

- Audio books and Text-to-speech platforms
- Leveled texts/Vocabulary Readers
- Leveled informational texts via online
- Extended time as needed
- Read directions aloud
- Assist with organization
- Use of computer
- Emphasize/highlight key concepts
- Recognize success
- Provide timelines for work completion
- Break down multi-step tasks into smaller chunks
- Provide copy of class notes and graphic organizer

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English Language Learners	Modifications for Gifted Students
<p>All WIDA Can Do Descriptors can be found at this link: https://wida.wisc.edu/teach/can-do/descriptors</p> <p><input type="checkbox"/> Grade 3 WIDA Can Do Descriptors:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Listening <input type="checkbox"/> Speaking <input type="checkbox"/> Reading <input type="checkbox"/> Writing <input type="checkbox"/> Oral Language <p>Students will be provided with accommodations and modifications that may include:</p> <ul style="list-style-type: none"> • Relate to and identify commonalities in science studies in student’s home country • Assist with organization • Use of computer • Emphasize/highlight key concepts • Teacher Modeling • Peer Modeling • Label Classroom Materials - Word Walls 	<p>Students excelling in mastery of standards will be challenged with complex, high level challenges related to the topic.</p> <ul style="list-style-type: none"> • Raise levels of intellectual demands • Require higher order thinking, communication, and leadership skills • Differentiate content, process, or product according to student’s readiness, interests, and/or learning styles • Provide higher level texts • Expand use of open-ended, abstract questions • Critical and creative thinking activities that provide an emphasis on research and in-depth study • Enrichment Activities/Project-Based Learning/ Independent Study <p>Additional Strategies may be located at the links:</p> <ul style="list-style-type: none"> ❖ Gifted Programming Standards ❖ Webb’s Depth of Knowledge Levels and/or Revised Bloom’s Taxonomy ❖ REVISED Bloom’s Taxonomy Action Verbs

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Interdisciplinary Connections

Interdisciplinary Connections:

ELA Standards:

RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). (3-LS1-1)

SL.3.5 Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details. (3-LS1-1)

RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS3-1),(3-LS3-2)

RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS3-1),(3-LS3-2)

RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS3-1),(3-LS3-2)

W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1),(3-LS3-2)

SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS3-1),(3-LS3-2)

Math Standards:

3.NBT Number and Operations in Base Ten (3-LS1-1)

3.NF Number and Operations—Fractions (3-LS1-1) **MP.2** Reason abstractly and quantitatively. (3-LS3-1),(3-LS3-2), (3-LS4-2)

MP.4 Model with mathematics. (3-LS3-1),(3-LS3-2), (3-LS1-1), (3-LS4-2)

3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. (3-LS4-2)

3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS3-1),(3-LS3-2)

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Integration of Computer Science and Design Thinking NJSL 8

- 8.1.5.DA.1:** Collect, organize, and display data in order to highlight relationships or support a claim.
- 8.1.5.DA.3:** Organize and present collected data visually to communicate insights gained from different views of the data.
- 8.1.5.DA.5:** Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
- 8.2.5.ED.1:** Explain the functions of a system and its subsystems.
- 8.2.5.ED.2:** Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
- 8.2.5.ED.3:** Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
- 8.2.5.ED.4:** Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints).
- 8.2.5.ED.5:** Describe how specifications and limitations impact the engineering design process.
- 8.2.5.ED.6:** Evaluate and test alternative solutions to a problem using the constraints and trade- offs identified in the design process.
- 8.2.5.ITH.1:** Explain how societal needs and wants influence the development and function of a product and a system.
- 8.2.5.ITH.2:** Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have.
- 8.2.5.ITH.3:** Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use.
- 8.2.5.ITH.4:** Describe a technology/tool that has made the way people live easier or has led to a new business or career.
- 8.2.5.ETW.3:** Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.