Winslow Township School District

Grade 4 Science

Unit 2: Energy and Motion

Overview: In this unit the primary focus will be upon the faster an object is moving, the more energy it possesses and the slower an object is moving the less energy it possesses. Students will study that moving objects, sound, light and heat all have energy and that energy can be moved from place to place by moving objects through sound, light or electric currents. Students will also focus on when objects collide, the energy can be transferred from one object to another which causes their motion/direction to change, that distance affects the speed of something, sound is produced when energy is transferred during a collision and that electric currents can produce motion, sound, heat or light.

Overview	Standards for Science	Unit Focus	Essential Questions
Unit 2 **Energy and Motion**	• **4-PS3-1** • **4-PS3-2** • **4-PS3-3** • **4-PS3-4** • **WIDA 1,4**	• Measure outcome from different energy sources • Make observations that provide evidence that energy can be transferred • Ask questions and predict outcomes about the changes in energy that occur when objects collide • Apply scientific ideas to design and test a device that converts energy between forms • Use evidence to construct an explanation relating the speed of an object to the energy of that object • Make observations of speed changes and demonstrate how speed changes based on energy • Analyze how energy can go through an electric current and predict what would happen to the motion of an object during a collision • Use evidence to determine how motion is affected by collisions and draw conclusions regarding the impact of friction on motion	• What is the relationship between speed and energy? • How is energy transferable? • What happens to the energy when objects collide?
Unit 2: Enduring Understandings	• The faster an object is moving, the more energy it possesses. • The slower an object is moving the less energy it possesses. • Moving objects, sound, light and heat all have energy. • Energy can be moved from place to place by moving objects through sound, light or electric currents. • When objects collide, the energy can be transferred from one object to another which causes their motion/direction to change. • Distance affects the speed of something. • Sound is produced when energy is transferred during a collision. • Electric currents can produce motion, sound, heat or light.		

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Curriculum Unit 2	Standards		Pacing	
			Days	Unit Days
Unit 2: **Energy and Motion**	**4-PS3-1**	Use evidence to construct an explanation relating the speed of an object to the energy of that object.	7	36
	4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	8	
	4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.	7	
	4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	8	
	Assessment, Re-teach and Extension		6	

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Unit 2 Grade 4		
Disciplinary Core Ideas	**Indicator #**	**Indicator**
PS3.A: Definitions of Energy The faster a given object is moving, the more energy it possesses. (4- PS3-1) **PS3.B: Conservation of Energy and Energy Transfer** Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2),(4-PS3-3) **PS3.C: Relationship Between Energy and Forces** When objects collide, the contact forces transfer energy so as to change the objects' motions. (4-PS3-3) **PS3.D: Energy in Chemical Processes and Everyday Life** The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4)	**4-PS3-1**	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
	4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
	4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.
	4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

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<table>
<tr><th colspan="2">Unit 2 Grade 4</th></tr>
<tr><th colspan="2">• Assessment Plan</th></tr>
<tr><td>• Class discussions
• Student participation
• 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</td><td>• Benchmark assessments
• Short Constructed Responses
• Students will use evidence to construct an explanation relating the speed of a ball traveling down an incline plane to the energy of the ball and ask questions and predict outcomes about the changes in energy that occur when a ball and a toy car or similar object collide.</td></tr>
<tr><th>Resources</th><th>Activities</th></tr>
<tr><td>•Chromebooks
•<u>HSP Science Book correlations:</u> Chapter 15: lesson 3; Chapter 16 – all lessons.
• Energy Makes Things Happen by: Kimberly Brubaker Bradley
• Exploring Forces by: Claire Liewellyn
• Newton’s Law of Motion by: Jenny Karpelenia
• Youtube: Newton’s Law of Motion http://www.watchknowlearn.org/Video.aspx?VideoID=30312
• Science of Disney Imagineering: Newton’s 3 Laws of Motion - Classroom Edition https://www.youtube.com/watch?v=_QpF3m02rGI
• StudyJams http://studyjams.scholastic.com/studyjams/
• Science A-Z (Subscription Service) https://www.sciencea-z.com/
• Online Circuit Simulator https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc
• http://sciencenetlinks.com/tools/
• Learning game: http://sciencenetlinks.com/media/filer/2011/10/07/powerup.swf
• Diversity, Equity & Inclusion Educational Resources https://www.nj.gov/education/standards/dei/</td><td>• mini-lessons
• independent reading
• films
• website exploration
• discussions, dialogues
• debates
• partner or small group work
• student presentations, reports, journals, reflections,
• in-class assessments,
• written reports, essays, research, and homework</td></tr>
</table>

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Instructional Best Practices and Exemplars	
1. Identifying similarities and differences 2. Summarizing and note taking 3. Reinforcing effort and providing recognition 4. Homework and practice 5. Nonlinguistic representations	6. Cooperative learning 7. Setting objectives and providing feedback 8. Generating and testing hypotheses 9. Cues, questions, and advance organizers 10. Manage response rates

9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training & 9.4 Life Literacies and Key Skills

9.1.5.EG.3: Explain the impact of the economic system on one's personal financial goals.
9.1.5. EG.4: Describe how an individual's financial decisions affect society and contribute to the overall economy.
9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
9.2.5.CAP.3: Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
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.GCA.1: Analyze how culture shapes individual and community perspectives and points of view (e.g., 1.1.5.C2a, RL.5.9, 6.1.5.HistoryCC.8).
9.4.5.TL.4: Compare and contrast artifacts produced individually to those developed collaboratively (e.g., 1.5.5.CR3a).

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
All WIDA Can Do Descriptors can be found at this link: https://wida.wisc.edu/teach/can-do/descriptors ☐ Grades 4-5 WIDA Can Do Descriptors: ☐ Listening ☐ Speaking ☐ Reading ☐ Writing ☐ Oral Language Students will be provided with accommodations and modifications that may include: • 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	Students excelling in mastery of standards will be challenged with complex, high level challenges related to the topic. • 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 Additional Strategies may be located at the links: ❖ 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:** **W.4.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-LS1-1) **SL.4.5** Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-LS1-2), (4-PS4-2) **Math Standards:** **4.G.A.1** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-1),(4-PS4- 2) **4.G.A.3** Recognize a line of symmetry for a two- dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line symmetric figures and draw lines of symmetry. (4-LS1-1)
Integration of Computer Science and Design Thinking NJSLS 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.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.ITH.1:** Explain how societal needs and wants influence the development and function of a product and a system.