

Winslow Township School District
Grade 4 Science
Unit 5: Waves

Overview: In this unit the primary focus will be upon studying and understanding key vocabulary terms such as: wave, wave peak, amplitude, wavelength, radiation, magnetism, electromagnetic. Students will also study the properties of waves and the relationship between mass and space (ductility, elasticity, hardness and tenacity). Lastly, students will learn that the electromagnetic spectrum is the full range of wavelengths of radiation from the sun, and it includes visible light, heat energy, sound waves, and many other types of energy (microwave, radar, x-ray, and gamma radiation).

Overview	Standards for Science	Unit Focus	Essential Questions
<p>Unit 5</p> <p>Waves</p>	<ul style="list-style-type: none"> • 4-PS4-1 • 4-PS4-2 • 4-PS4-3 • WIDA 1,4 	<ul style="list-style-type: none"> • Ask questions and predict outcomes about changes in patterns of wavelengths. • Develop a model of waves to describe patterns of amplitude and wavelengths. • Analyze how light reflects from objects and enters the eye. • Make observations of the behavior of waves in air and water. • Demonstrate different amplitudes and pitch using musical instruments. • Apply scientific ideas to design and test a device that uses patterns to transfer information. 	<ul style="list-style-type: none"> • How are wavelength, frequency and wave speed related? • How do technology and waves interact? • What do waves look like in the air, water, etc...? • What is the relationship between vision and light?
<p><i>Unit 5: Enduring Understandings</i></p>	<ul style="list-style-type: none"> • Energy can be transmitted from a source as waves. • Waves carry energy from one place to another. • The electromagnetic spectrum in increasing frequencies includes microwaves, infrared light, visible light, ultraviolet light, X rays and Gamma rays. • Waves have different properties and relationships. • The absorption and reflection of light waves by various materials result in the human perception of color. 		

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Curriculum Unit 5	Standards		Pacing	
			Days	Unit Days
Unit 5: Waves	4-PS4-1	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.	10	36
	4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	10	
	4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.	10	
	Assessment, Re-teach and Extension		6	

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Unit 5 Grade 4		
Disciplinary Core Ideas	Indicator #	Indicator
<p>PS4.A: Wave Properties Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. (4-PS4- 1)</p> <p>PS4.B: Electromagnetic Radiation An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)</p> <p>PS4.C: Information Technologies and Instrumentation Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3)</p>	4-PS4-1	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
	4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
	4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.

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• Assessment Plan	
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Benchmark assessments • Short Constructed Responses • Students will develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
Resources	Activities
<ul style="list-style-type: none"> • Chromebooks • HSP Science Book correlations: Chapter 13, all lessons • Study Jams http://studyjams.scholastic.com/studyjams/ • Science AZ (Subscription Service) https://www.sciencea-z.com/ • Bill Nye the Science Guy: “Sound Travels in Waves” (Short Clip, 1:20) https://www.youtube.com/watch?v=ACeUO4ufx2I • Bill Nye the Science Guy: “Waves” (Full Episode) https://www.youtube.com/watch?v=fuM06zp48w4 • Diversity, Equity & Inclusion Educational Resources https://www.nj.gov/education/standards/dei/ 	<ul style="list-style-type: none"> • 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

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Instructional Best Practices and Exemplars

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

9.1.5.EG.1: Explain and give examples of what is meant by the term “tax.”

9.1.5.EG.2: Describe how tax monies are spent

9.2.5.CAP.5: Identify various employee benefits, including income, medical, vacation time, and lifestyle benefits provided by different types of jobs and careers.

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.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).

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"/> Grades 4-5 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.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-PS4-3)

RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4- PS4-3)

W.4.1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

W.4.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-PS4-1), (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)

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.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.