



# **Stackable Instructionally- embedded Portable Science (SIPS) Assessments Project**

## **Grade 8 Science Unit 4 End of Unit Assessment Unpacking Tools Providing Solutions to Problems Using Simple Wave Properties August 2023**

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## SIPS Grade 8 Unit 4 End of Unit Assessment Unpacking Tools

**NGSS Performance Expectation: MS-PS4-1.** Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. [Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.] [Assessment Boundary: Assessment does not include electromagnetic waves and is limited to standard repeating waves.]

	Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
<b>Foundations</b>	<p><b>SEP: Using Mathematics and Computational Thinking</b></p> <p>Use mathematical representations to describe and/or support scientific conclusions and design solutions.</p>	<p><b>PS4.A: Wave Properties</b></p> <p>A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude.</p>	<p><b>CCC: Patterns</b></p> <p>Graphs and charts can be used to identify patterns in data.</p>
<b>Key Aspects</b>	<ul style="list-style-type: none"> <li>Use mathematical representations to describe scientific conclusions.</li> <li>Use mathematical representations to support scientific conclusions.</li> <li>Use mathematical representations to describe design solutions.</li> <li>Use mathematical representations to support design solutions.</li> </ul>	<ul style="list-style-type: none"> <li>A simple wave has a repeating pattern.</li> <li>A simple wave has a specific wavelength.</li> <li>A simple wave has a specific frequency.</li> <li>A simple wave has a specific amplitude.</li> <li>The wavelength and frequency of a wave are related to one another by the speed of travel of the wave.</li> <li>The higher the frequency of the wave the shorter the wavelength.</li> <li>The lower the frequency of the wave the longer the wavelength.</li> <li>The higher the frequency of the wave the higher the amplitude.</li> <li>The lower the frequency of the wave the lower the amplitude.</li> </ul>	<ul style="list-style-type: none"> <li>Use graphs to represent and identify patterns.</li> <li>Use charts to represent and identify patterns.</li> <li>Identify the presence of patterns in phenomena or data.</li> <li>Characterize the strength, direction, or nature of patterns in phenomena or data.</li> </ul>
<b>Prior Knowledge</b>	<ul style="list-style-type: none"> <li>Knowledge of units and unit conversions.</li> <li>Knowledge of ratio relationships.</li> <li>Ability to interpret qualitative data.</li> <li>Ability to represent proportional relationships.</li> <li>Knowledge of linear relationships.</li> </ul>	<ul style="list-style-type: none"> <li>Waves can cause objects to move.               <ul style="list-style-type: none"> <li>Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).</li> </ul> </li> </ul>	<p><b>Relationships to SEPs:</b></p> <p><b>5) Using Mathematics and Computational Thinking and 2) Developing</b></p> <ul style="list-style-type: none"> <li>A sense of scale is necessary in order to know what properties and what aspects of shape or material are relevant at a particular magnitude or in investigating particular phenomena.</li> <li>Patterns are helpful when interpreting data, which may supply valuable evidence in</li> </ul>

**and Using  
Models**

support of an explanation or a particular solution to a problem.

- Models include mathematical representations.
- Models may be used to analyze a system or to test possible solutions to a problem.

**NGSS Performance Expectation: MS-PS4-2** Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. *[Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.] [Assessment Boundary: Assessment is limited to qualitative applications pertaining to light and mechanical waves.]*

	Science and Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
<b>Foundations</b>	<p><b>SEP: Developing and Using Models</b></p> <p>Develop and use a model to describe phenomena.</p>	<p><b>PS4.A: Wave Properties</b></p> <p>A sound wave needs a medium through which it is transmitted.</p>	<p><b>CCC: Structure and Function</b></p> <p>Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.</p>
<b>Key Aspects</b>	<ul style="list-style-type: none"> <li>Develop a model to predict phenomena.</li> <li>Develop a model to describe phenomena.</li> <li>Identify appropriate aspects of a given phenomenon to include in a model.</li> <li>Explain the relationships among the components of a model.</li> <li>Specify or identify the limitations of the model and describe why these limitations exist.</li> </ul>	<ul style="list-style-type: none"> <li>Sound waves need a medium (air, water, or solid material) to travel through.</li> </ul>	<ul style="list-style-type: none"> <li>Design structures to serve different functions.</li> <li>Design structures based on the properties of its materials.</li> <li>The shape and stability of structures of natural and designed objects are related to their function(s).</li> </ul>
<b>Prior Knowledge</b>	<ul style="list-style-type: none"> <li>Knowledge of units and unit conversions.</li> <li>Knowledge of ratio relationships.</li> <li>Ability to interpret qualitative data.</li> <li>Ability to represent proportional relationships.</li> <li>Knowledge of linear relationships.</li> </ul>	<ul style="list-style-type: none"> <li>Waves can cause objects to move.</li> <li>Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).</li> </ul>	<p><b>Relationships to SEPs:</b></p> <p>2) <b>Developing and Using Models and</b></p> <p>5) <b>Using Mathematics and Computational Thinking</b></p> <ul style="list-style-type: none"> <li>A sense of scale is necessary in order to know what properties and what aspects of shape or material are relevant at a particular magnitude or in investigating particular phenomena.</li> <li>Data analysis serves to demonstrate the relative magnitude of some properties or processes.</li> </ul>