SCILLSS Classroom Science Assessment Workshop

**Grade 8 SCILLSS Model Unpacking Tools**

## Grade 8 SCILLSS Model Unpacking Tool for MS-PS4-1

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| **Grade:** | 8 |
| **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)** |
| **Foundations** | **SEP: Using Mathematics and Computational Thinking**Use mathematical representations to describe and/or support scientific conclusions and design solutions. | **PS4.A: Wave Properties** A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude. | **CCC: Patterns**Graphs and charts can be used to identify patterns in data. |
| **Key Aspects** | * Use mathematical representations to describe scientific conclusions
* Use mathematical representations to support scientific conclusions
* Use mathematical representations to describe design solutions
* Use mathematical representations to support design solutions
 | * A simple wave has a repeating pattern
* A simple wave has a specific wavelength
* A simple wave has a specific frequency
* A simple wave has a specific amplitude
* The wavelength and frequency of a wave are related to one another by the speed of travel of the wave
* The higher the frequency of the wave the shorter the wavelength
* The lower the frequency of the wave the longer the wavelength
* The higher the frequency of the wave the higher the amplitude
* The lower the frequency of the wave the lower the amplitude
 | * Use graphs to represent and identify patterns
* Use charts to represent and identify patterns
* Identify the presence of patterns in phenomena or data
* Characterize the strength, direction, or nature of patterns in phenomena or data
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| **Prior Knowledge** | * Knowledge of units and unit conversions
* Knowledge of ratio relationships
* Ability to interpret qualitative data
* Ability to represent proportional relationships
* Knowledge of linear relationships
 | * Waves can cause objects to move
* Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks)
 | **Relationships to SEPs** | * Explanations address how and why particular patterns occur
* Models describe observed patterns or predict patterns
* Data analysis serves to identify and characterize patterns
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## Grade 8 SCILLSS Model Unpacking Tool for MS-PS4-2

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| **Grade:** | 8 |

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| **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)** |
| **Foundations** | **SEP: Developing and Using Models**Develop and use a model to describe phenomena. | **PS4.A: Wave Properties** A sound wave needs a medium through which it is transmitted. | **CCC: Structure and Function**Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and use. |
| **Key****Aspects** | * Develop a model to predict phenomena.
* Develop a model to describe phenomena.
* Identify appropriate aspects of a given phenomenon to include in a model.
* Explain the relationships among the components of a model.
* Specify or identify the limitations of the model and describe why these limitations exist.
 | * Sound waves need a medium (air, water, or solid material) to travel through.
 | * Design structures to serve different functions.
* Design structures based on the properties of its materials.
* The shape and stability of structures of natural and designed objects are related to their function(s).
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| **Prior Knowledge** | * Knowledge of units and unit conversions
* Knowledge of ratio relationships
* Ability to interpret qualitative data
* Ability to represent proportional relationships
* Knowledge of linear relationships
 | * Waves can cause objects to move.
* Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).
 | **Relationships to SEPs** | * 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.
* Data analysis serves to demonstrate the relative magnitude of some properties or processes.
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