SCILLSS Classroom Science Assessment Workshop

**Grade 8 SCILLSS Model Task Specifications Tools**

## Grade 8 SCILLSS Model Task Specifications Tool for MS-PS4-1

| Element | Description |
| --- | --- |
| 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. |
| Knowledge, Skills, & Abilities (KSAs)  | **KSA1:** Create a representation that describes a simple wave has a repeating pattern.**KSA2:** Use models and mathematical thinking to demonstrate understanding of wave properties.**KSA3:** Identify patterns as an organizing concept for understanding wave properties.**KSA4:** 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. |
| Student Demonstration of Learning | * Model accurately represents the observable phenomena
* Model accurately captures all mechanistic features of the observable phenomena
* Model accurately shows relationships among wave properties
* Applies correctly a simple mathematical wave model to a physical system or phenomenon to identify how the wave model characteristics correspond with physical observations
* Predicts correctly the change in the energy of the wave if any one of the parameters of the wave is changed
* Identiﬁes relevant or meaningful patterns that address a scientiﬁc question
* Identifies and describes relevant relationships between components of the model
* Shows patterns in waves that accurately interpret the relationship between frequency and wavelength
 |
| Work Product | * Draw a model
* Complete a model
* Mathematical representations
* Constructed-response
 |
| Task Features | * All tasks require evidence of qualitative or quantitative thinking.
* All tasks must prompt students to make connections between observed phenomenon or evidence and reasoning underlying the observation/evidence (e.g., related to standard repeating waves).
* All tasks must elicit core ideas as defined in the PE.
* All tasks must include elements from at least two dimensions of the NGSS.
 |
| Aspects of an assessment task that can be varied to shift complexity or focus | * Complexity of scientific concept(s) to be represented
* Function of the representation:
	+ to explain a mechanism underlying a phenomenon;
	+ to predict future outcomes;
	+ to describe a phenomenon;
	+ to generate data to inform how the world works
* The representation may be provided for revision or one that is created from scratch
* What type of wave is being modeled
* Use or purpose of the representation
* Type of representation (e.g., mathematical/picture)
* Core idea targeted (e.g., sound sources, the medium, deformation, and vibration of an instrument’s string)
 |
| Assessment Boundaries | * Assessment does not include electromagnetic waves and is limited to standard repeating waves.
* Assessment should be limited to qualitative applications pertaining to light and mechanical waves.
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## Grade 8 SCILLSS Model Task Specifications Tool for MS-PS4-2

| Element | Description |
| --- | --- |
| Performance Expectation | **MS-PS4-2.** Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various material. |
| The Knowledge, Skills, & Abilities (KSAs)  | **KSA1:** Develop a model to describe the transmission of waves.**KSA2:** Use a model to make sense of given phenomena involving reflection, absorption, or transmission properties of light and matter waves.**KSA3:** Identify characteristics of the wave after it has interacted with a material (e.g., frequency, amplitude, wavelength).**KSA4:** Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various material. |
| Student Demonstration of Learning | * Model accurately represents the observable phenomena
* Model accurately captures all mechanistic features of the observable phenomena
* Model accurately shows the transmission of waves
* Describes correctly how waves transmit energy
* Describes accurately that vibrations in materials set up wavelike disturbances that spread away from the source, such as sound waves
* Describes correctly whether the model shows how waves are reflected, absorbed, or transmitted through a material
 |
| Work Product | * Draw a model
* Complete a model
* Constructed-response
* Short-response
 |
| Task Features | * All tasks require evidence of qualitative and quantitative thinking.
* All tasks must prompt students to make connections between observed phenomenon or evidence and reasoning underlying the observation/evidence.
* Students use scientific reasoning and process skills in observational (nonexperimental) investigations.
* All tasks must elicit core ideas as defined in the PE.
* All tasks must include elements from at least two dimensions of the NGSS.
 |
| Aspects of an assessment task that can be varied to shift complexity or focus | * Type of wave presented (e.g., sound, electromagnetic, mechanical, light)
* Format of "real-world" phenomenon under investigation: image, data, text, combination
* Standard units used (e.g., grams, liters)
* Use or purpose of the model
* Type of model (e.g., physical/virtual)
* Core idea targeted in model (e.g., light sources, the materials, polarization of light, ray diagrams)
 |
| Assessment Boundaries | * Assessment is limited to qualitative applications pertaining to mechanical waves.
* Assessment is limited to standard repeating waves and should not include electromagnetic waves.
* Assessment should be limited to qualitative applications pertaining to light and mechanical waves.
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