SCILLSS Classroom Science Assessment Workshop

**Grade 11 SCILLSS Model Task Specifications Tools**

## Grade 11 SCILLSS Model Task Specifications Tool for HS-ESS1-5

| Element | | Description |
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| Performance Expectation | **HS-ESS1-5.** Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. | |
| The Knowledge, Skills, & Abilities (KSAs) | **KSA1:** Investigate how Earth’s internal and surface processes operate at different spatial and temporal scales to explain the ages of crustal rocks.  **KSA2:** Synthesize the relevant evidence to describe the relationship between the motion of continental plates and the patterns in the ages of crustal rocks.  **KSA3:** Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. | |
| Student Demonstration of Learning | * Model accurately represents the observable phenomena. * Model accurately captures all mechanistic features of the observable phenomena. * Use a model to make an accurate prediction about a phenomenon (e.g., direction of plate movement). * Represents only the appropriate relationships and/or interactions among the elements in the model needed to explain the target phenomenon and describes why these relationships are important. * Organizes data in a clear way that highlights patterns that are relevant or meaningful to a scientiﬁc question. * Synthesizes relevant evidence and relevant or meaningful patterns to defend a claim or support an argument. | |
| Work Product | * Group discussion * Draw a model * Laboratory exercise * Short-response * Constructed-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. * Models provided in stimulus materials must illustrate a process or why a phenomenon exists (e.g., plate movement). * All tasks are presented in a context that revolves around movement of crustal rocks. * All phenomena for which a model is developed must be observable or fit available evidence (e.g., plate tectonics to explain the ages of crustal rocks). * 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 | * Complexity of empirical evidence needed to identify patterns. * Format of "real-world" phenomenon presented: image, data, text, combination. * What characteristics are included (given or determined by the student). * Core idea targeted in model (e.g., the degree to which nuclear processes are included). * The degree to which scientific vocabulary is required/used/scaffolded. | |
| Assessment Boundaries | * Students do not need to demonstrate comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth’s other systems. * Assessment is limited to alpha, beta, and gamma radioactive decays. * Students do not need to calculate radioactive decay rates. * Students do not need to know: names of supercontinents, names of fault lines, names of tectonic plates. | |

## Grade 11 SCILLSS Model Task Specifications Tool for HS-ESS2-7

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| Element | | Description |
| Performance Expectation | **HS-ESS2-7:** Construct an argument based on evidence about the simultaneous co-evolution of Earth's systems and life on Earth. | |
| The Knowledge, Skills, & Abilities (KSAs) | **KSA1:** Construct an argument using causal links and feedback mechanisms between changes in the biosphere and changes in Earth’s other systems, that there is simultaneous co-evolution of Earth's systems and life on Earth.  **KSA2:** Construct an argument based on evidence about the simultaneous co-evolution of Earth's systems and life on Earth. | |
| Student Demonstration of Learning | * Model accurately represents the observable phenomena. * Model accurately captures all mechanistic features of the observable phenomena. * Use a model to make an accurate prediction about a phenomenon (e.g., direction of plate movement). * Represents only the appropriate relationships and/or interactions among the elements in the model needed to explain the target phenomenon and describes why these relationships are important. * A statement accurately describing how stability and change are related and a good model for a system must be able to offer explanations for both. * Organizes data in a clear way that highlights changes observed from the evidence that are relevant or meaningful to a scientiﬁc question. * Synthesizes relevant evidence related to complex systems and comprehend subtle issues of stability or of sudden or gradual change over time to defend a claim or support an argument or counter-argument. | |
| Work Product | * Constructed-response * Short-response * Draw a model | |
| Task Features | * All tasks must prompt students to make connections between observed phenomenon or evidence and reasoning underlying the observation/evidence (e.g., changes in the biosphere and changes in Earth’s other systems; ancient versus current atmospheric composition). * All tasks require the use of examples to support a logical argument in a context that revolves around changes in the biosphere and changes in Earth’s other systems. * 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 | * Scale of mechanistic relationships in account of how things change and how they remain stable. * Complexity of the scientific reasoning required to assess the extent to which the reasoning and data support the argument. * Format of "real-world" phenomenon presented: image, data, text, combination. | |
| Assessment Boundaries | * Students do not need to demonstrate a comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth’s other systems. | |

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