



Stackable Instructionally- embedded Portable Science (SIPS) Assessments Project

Grade 8 Science Unit 2 Range Performance Level Descriptors Gravity and Motion of Objects in the Solar System September 2023

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SIPS Grade 8 Unit 2 Range Performance Level Descriptors

Grade 8 Unit 2 Assessment Performance Expectations

MS-ESS1-1 Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. *[Clarification Statement: Examples of models can be physical, graphical, or conceptual.]*

MS-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. *[Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as students' school or state).]*
[Assessment Boundary: Assessment does not include Kepler's Laws of orbital motion, or the apparent retrograde motion of the planets as viewed from Earth.]

MS-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system. *[Clarification Statement: Emphasis is on the analysis of data from Earth-based instruments, space-based telescopes, and spacecraft to determine similarities and differences among solar system objects. Examples of scale properties include the sizes of an object's layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of data include statistical information, drawings and photographs, and models.]* *[Assessment Boundary: Assessment does not include recalling facts about properties of the planets and other solar system bodies.]*

MS-PS2-4 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. *[Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.]* *[Assessment Boundary: Assessment does not include Newton's Law of Gravitation or Kepler's Laws.]*

SIPS Grade 8 Unit 2 Range Performance Level Descriptors

SIPS tasks require students to apply and transfer their science learning through engagement with science and engineering practices (SEPs) and application of the crosscutting concepts (CCCs) to demonstrate their understanding of disciplinary core ideas (DCIs) to make sense of and explain phenomena and/or to design solutions to phenomena-rooted engineering problems.

Level 1	Level 2	Level 3 (Target)	Level 4
<p>A student performing at this level produces evidence of three-dimensional science learning by their ability to:</p> <ul style="list-style-type: none"> use a provided model to develop a partial description related to the Earth-moon-sun system. 	<p>A student performing at this level produces evidence of three-dimensional science learning by their ability to:</p> <ul style="list-style-type: none"> use a model to support an explanation related to the Earth-moon-sun system. 	<p>A student performing at this level produces evidence of three-dimensional science learning by their ability to:</p> <ul style="list-style-type: none"> complete a partial model to support an accurate and complete explanation of a phenomenon related to the cyclical patterns of the Earth-moon-sun system. 	<p>A student performing at this level produces evidence of three-dimensional science learning by their ability to:</p> <ul style="list-style-type: none"> complete a partial model to support a scientifically accurate and complete explanation of a phenomenon related to the cyclical patterns of the Earth-moon-sun system.
<ul style="list-style-type: none"> use a provided model to develop a partial description related to gravity as the attractive force that keeps solar systems together. 	<ul style="list-style-type: none"> use a model to support an explanation related to the effect gravity has on the direction of motions of objects within the solar system. 	<ul style="list-style-type: none"> complete a partial model to support an accurate and complete explanation of the effect gravity has on the direction of motions of objects within the solar system. 	<ul style="list-style-type: none"> complete a partial model to support a scientifically accurate and complete explanation of the effect gravity has on the direction of motions of objects within the solar system.
<ul style="list-style-type: none"> identify components of a provided model to describe Earth’s solar system or the Milky Way Galaxy. 	<ul style="list-style-type: none"> partially complete a model to show the formation of the Milky Way Galaxy and Earth’s solar system. 	<ul style="list-style-type: none"> complete a partial model to support an accurate and complete explanation of the formation of the Milky Way Galaxy and Earth’s solar system from a dust cloud (nebula). 	<ul style="list-style-type: none"> organize and sequence events to represent and support a scientifically accurate and complete explanation of the formation of the Milky Way Galaxy and Earth’s solar system from a dust cloud (nebula).
<ul style="list-style-type: none"> use data regarding the magnitude of gravitational force exerted by different objects in Earth’s solar system to develop 	<ul style="list-style-type: none"> use data regarding the magnitude of gravitational force exerted by different objects in Earth’s solar system to develop an incomplete but accurate explanation of similarities and differences among 	<ul style="list-style-type: none"> compare data regarding the magnitude of gravitational force exerted by different objects in Earth’s solar system to support a scientifically accurate explanation 	<ul style="list-style-type: none"> compare data regarding the magnitude of gravitational force exerted by different objects in Earth’s solar system to support a scientifically accurate and complete explanation or prediction related to

<p>a partial description related to solar system objects (i.e., gravitational forces).</p>	<p>solar system objects (i.e., gravitational forces).</p>	<p>related to similarities and differences among solar system objects.</p>	<p>similarities and differences among solar system objects.</p>
<ul style="list-style-type: none"> • support a description of the different categories of solar system objects using some provided data as evidence. 	<ul style="list-style-type: none"> • support a description of the different categories of solar system objects using some appropriate data as evidence. 	<ul style="list-style-type: none"> • use data to develop graphical displays to draw accurate and complete conclusions related to different categories of solar system objects based on patterns of their features, composition, and locations within the solar system. 	<ul style="list-style-type: none"> • analyze and interpret data to draw scientifically accurate and complete conclusions with evidence related to different categories of solar system objects based on patterns of their features, composition, and locations within the solar system.
<ul style="list-style-type: none"> • use a provided model to develop a partial description related to representing objects at different scales ranging from the very small to the very large. 	<ul style="list-style-type: none"> • develop and use partially accurate models to support an explanation related to representing objects at different scales ranging from the very small to the very large. 	<ul style="list-style-type: none"> • develop and use accurate models (i.e., indicate the accuracy of size and distance [scale] relationships within the model) as evidence to create accurate and complete explanations of how two objects may be similar when viewed at one scale but may appear to be quite different when viewed at a different scale. 	<ul style="list-style-type: none"> • develop and use accurate models (i.e., indicate the accuracy of size and distance [scale] relationships within the model) as evidence to create scientifically accurate and complete explanations of how two objects may be similar when viewed at one scale but may appear to be quite different when viewed at a different scale.