

Grade 8: Space Systems

Stage 1 Desired Results

ESTABLISHED GOALS:	<i>Transfer</i>	
<u>Competencies:</u> - Nature of Science- Students will work collaboratively and individually to generate testable questions or define problems in terms of given constraints and criteria; plan and conduct investigations or apply engineering design practices to analyze and interpret data, and construct and communicate evidence-based explanations or possible optimal solutions. - Patterns- Students will observe, predict, and analyze patterns in order to support evidence-based claims about relationships (e.g., cause and effect, structure and function, macroscopic and microscopic). - Scale, Proportion and Quantity- Students will apply reasoning and modeling to determine the proportional relationships in observable and non-observable phenomena in terms of relative scale and quantity. - Systems and System Models- Students will investigate and analyze a natural or human designed system in order to develop and justify a model that accurately represents the system or aspects of the system (e.g., boundaries, inputs, outputs, interactions, and behaviors). - Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials. - Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences. - Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style. <u>Content Standards:</u> - MS-ESS1-1 Develop and use a model of the Earth-sun-moon systems to describe the cyclic patterns of lunar phases,	<i>Students will be able to independently use their learning to analyze celestial objects and motions in order to predict cyclical patterns and resulting phenomena.</i>	
	<i>Meaning</i>	
	ENDURING UNDERSTANDINGS <i>Students will understand that...</i> - patterns can be used to identify cause and effect relationships. - time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. - models can be used to represent systems and their interactions.	ESSENTIAL QUESTIONS - How does the motion of celestial objects influence phenomena on Earth?

eclipses of the sun and moon, and seasons. - MS-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. - MS-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system.	<table> <tr> <th colspan="2" data-bbox="751 89 2011 159">Acquisition</th></tr> <tr> <td data-bbox="751 159 1381 1375"> <i>Students will know...</i> - that patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. - that Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. - that the solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. - that this model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. - that the solar system appears to have formed from a disk of dust and gas, drawn together by gravity. - that tides occur as a result of the gravitational pull of the Moon and the Sun on Earth's oceans <u>vocabulary</u>: star, nebula, fusion, accretion, inertia, gravity, solar system, galaxies, celestial, satellite, planet, asteroid, meteoroid, comet, constellation, universe, equinox, solstice, axis, rotation, revolution, phases, eclipses, tides, orbit, ellipse </td><td data-bbox="1381 159 2011 1375"> <i>Students will be skilled at...</i> - developing and using models. - analyzing and interpreting data. - supporting scientific arguments using evidence. </td></tr> </table>	Acquisition		<i>Students will know...</i> - that patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. - that Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. - that the solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. - that this model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. - that the solar system appears to have formed from a disk of dust and gas, drawn together by gravity. - that tides occur as a result of the gravitational pull of the Moon and the Sun on Earth's oceans <u>vocabulary</u>: star, nebula, fusion, accretion, inertia, gravity, solar system, galaxies, celestial, satellite, planet, asteroid, meteoroid, comet, constellation, universe, equinox, solstice, axis, rotation, revolution, phases, eclipses, tides, orbit, ellipse	<i>Students will be skilled at...</i> - developing and using models. - analyzing and interpreting data. - supporting scientific arguments using evidence.
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Content Area Literacy Standards	21 st Century Skills
• RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. • RST.6-8.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. • RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. • RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 6-8 texts and topics</i>. • RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually. • RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. • WHST.6-8.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. • WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. • WHST.6-8.6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently. • WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. • WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.	• <i>reason effectively</i> • <i>make judgments and decisions</i> • <i>solve problems</i> • <i>use systems thinking</i>

Stage 2 - Evidence

<i>Evaluative Criteria</i>	<i>Assessment Evidence</i>
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan

Summary of Key Learning Events and Instruction

<i>Science and Engineering Practices</i>	<i>Mathematics Integration</i>
S&EP 2. Developing and using models S&EP 4. Analyzing and interpreting data S&EP 5. Using mathematics and computational thinking S&EP 6. Constructing explanations (for science) and designing solutions (for engineering)	• MP.2 Reason abstractly and quantitatively. • MP.4 Model with mathematics. • 6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. • 7.RP.A.2 Recognize and represent proportional relationships between quantities. • 6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. • 7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
<i>Technology Integration</i>	<i>District Materials</i>