

Grade 8: Weather and Climate

Stage 1 Desired Results

ESTABLISHED GOALS:	<i>Transfer</i>	
<u>Competencies:</u> - Cause and Effect- Students will investigate, explain, and evaluate potential causal relationships, using evidence to support claims and predictions about the mechanisms that drive those relationships. - 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). - Energy and Matter in Systems- Students will analyze evidence (e.g., investigations, models, theories, scenarios) to predict and track changes in the cycling of matter and flow of energy within and between systems in order to identify their possibilities and limitations. - Stability and Change- Students will analyze and evaluate the stability of natural and human designed systems in order to develop evidence-based explanations and predictions of changes over time. - 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-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. - MS-ESS2-5. Collect data to provide evidence for how the	<i>Students will be able to independently use their learning to understand climate factors and predict weather.</i>	
	<i>Meaning</i>	
	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
	<i>Students will understand that...</i> - cause and effect relationships may be used to predict phenomena in natural or designed systems. - models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. - stability might be disturbed either by sudden events or gradual changes that accumulate over time.	- How can we predict weather accurately when its complexity requires using probabilities?

motions and complex interactions of air masses results in changes in weather conditions. - MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. - MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	<table> <tr> <th colspan="2" data-bbox="751 89 2011 159">Acquisition</th></tr> <tr> <td data-bbox="751 159 1381 1477"> <i>Students will know...</i> - climate is influenced by latitude, elevation, proximity to large bodies of water, and geography - that variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. - that local and global winds form as a result of variations in air pressure, temperature, and the Earth's rotation, leading to the movement of air masses on both small and large scales. - that air masses interact, leading to the formation of weather systems and the influence of factors such as temperature, humidity, and pressure gradients on atmospheric circulation patterns. - that weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. - that water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. - that global movements of water and its changes in form are propelled by sunlight and gravity. - that the ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. - rising global temperatures are contributing to the intensification of severe weather events, alterations in weather patterns, and </td><td data-bbox="1381 159 2011 1477"> <i>Students will be skilled at...</i> - developing and using models. - interpreting data to carry out investigations. - supporting scientific arguments using evidence. - asking questions to clarify evidence. </td></tr> </table>	Acquisition		<i>Students will know...</i> - climate is influenced by latitude, elevation, proximity to large bodies of water, and geography - that variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. - that local and global winds form as a result of variations in air pressure, temperature, and the Earth's rotation, leading to the movement of air masses on both small and large scales. - that air masses interact, leading to the formation of weather systems and the influence of factors such as temperature, humidity, and pressure gradients on atmospheric circulation patterns. - that weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. - that water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. - that global movements of water and its changes in form are propelled by sunlight and gravity. - that the ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. - rising global temperatures are contributing to the intensification of severe weather events, alterations in weather patterns, and	<i>Students will be skilled at...</i> - developing and using models. - interpreting data to carry out investigations. - supporting scientific arguments using evidence. - asking questions to clarify evidence.
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	shifts in long-term climate conditions. - that because these patterns are so complex, weather can only be predicted probabilistically. <u>vocabulary</u>: climate, continental, maritime, polar, tropical, latitude, altitude, elevation, density, salinity, convection, conduction, radiation, fronts, occluded, stationary, local wind, global wind, current, infrared radiation, electromagnetic radiation, thermal energy transfer, temperature, albedo, meteorologist	
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Content Area Literacy Standards	21st 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.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.	• <i>interact effectively with others</i> • <i>solve problems</i> • <i>communicate clearly</i> • <i>make judgments and decisions</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 1. Asking questions and defining problems S&EP 2. Developing and using models S&EP 4. Analyzing and interpreting data S&EP 6. Constructing explanations (for science) and designing solutions (for engineering) S&EP 8. Obtaining, evaluating, and communicating information	• MP.2 Reason abstractly and quantitatively. • 6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. • 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>