Unit 7: Weather and Climate

Content Area: **Science**
Course(s): **Science 6**
Time Period: **May**
Length: **20 Days**
Status: **Published**

Unit Summary

What factors interact and influence weather and climate?

This unit is broken down into three sub-ideas: Earth's large-scale systems interactions, the roles of water in Earth's surface processes, and weather and climate. Students make sense of how Earth's geosystems operate by modeling the flow of energy and cycling of matter within and among different systems. A systems approach is also important here, examining the feedbacks between systems as energy from the Sun is transferred between systems and circulates through the ocean and atmosphere. The crosscutting concepts of cause and effect, systems and system models, and energy and matter are called out as frameworks for understanding the disciplinary core ideas. In this unit, students are expected to demonstrate proficiency in developing and using models and planning and carrying out investigations as they make sense of the disciplinary core ideas. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on MS-ESS2-4, MS-ESS2-5, and MS-ESS2-6.

Standards

SCI.6-8.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.
SCI.6-8.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.
SCI.6-8.MS-ESS2-5	Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.

Student Learning Objectives

SLO 1: Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. [Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.][Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.] (MS-ESS2-4)

SLO 2: Collect data to provide evidence for how the motions and complex interactions of air masses results **in changes in weather conditions.** [Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).] [Assessment Boundary: Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations.] (MS-ESS2-5)

SLO 3: Explain how variations in density result from variations in temperature and salinity drive a global pattern of interconnected ocean currents. [Note: This SLO is based on a disciplinary core idea found in the Framework. It is included as a scaffold to the following SLO.](ESS2.C)

SLO 4: Use a model to explain the mechanisms that cause varying daily temperature ranges in a coastal community and in a community located in the interior of the country. [Note: This SLO is based disciplinary core ideas found in the Framework. It is included as a scaffold to the following SLO.] (ESS2.C; ESS2.D)

SLO 5: 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.[Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.][Assessment Boundary: Assessment does not include the dynamics of the Coriolis effect.](MS-ESS2-6)

Essential Questions/ Enduring Understandings

Essential Questions

1. What factors interact and influence weather and climate?

2. Why do we not have the same weather day in and day out?

3. How can understanding Earth's systems help us predict future severe weather?

Enduring Understandings

Students will understand how density impacts temperature and salinity which in term impact ocean currents.

Students will understand how location near a large body of water impact temperature.

Students will understand how water travels around the world, a cycle powered by gravity and the sun.

Students will understand how air masses and their interactions are responsible for weather.

Students will understand how unequal heating due to Earth's rotation causes the patterns demonstrated with climates.