Unit 5 - Ocean Atmosphere and Climate

Content Area: **ELA**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

Unit Overview

In the Ocean, Atmosphere, and Climate unit, students investigate how ocean currents behave and what effect they have on the climate of different locations around the world, specifically the air temperature of various locations. Energy flow from the sun is what drives this progression.

Enduring Understandings

The amount of energy transferred from the sun to the surface of a location depends on the location's latitude.
Ocean currents can affect the air temperature of a location by affecting the amount of energy in the surface of the location.
The direction of prevailing winds and the position of the continents determine the path of ocean currents.

Essential Questions

What is a climatologist?
How does air get energy?
Why do different locations have different air temperatures?
What factors might affect ocean surface temperatures?
How do ocean currents affect the air temperatures of the locations they pass?
What determines how the ocean currents move?
How can changes to prevailing winds affect the air temperature of a location?

Learning Objectives

Students will identify and describe each of Earth's systems and the cycles that occur within them.
Students will develop and use models to investigate how Earth's systems interact.
Observe and describe the distribution of water on Earth, and explore the effect of the oceans on landforms, climates, and ecosystems.
Investigate and observe causes and effects as they run experiments with the Ocean, Atmosphere, and Climate Simulation and in two physical models.
Test the effects (particularly on air temperature) of changing the amount of energy transferred from the sun, presence or absence of a surface, changes to ocean currents and prevailing winds.
Reflect on several causes of regional air temperature differences.
Write explanations detailing the causes of cooling in Christchurch, New Zealand, during El Niño years.
Write an argument about the causes and effects on regional air temperature in the past (millions of years ago) and present-day locations of a landmass called South China.

Represent their ideas about cause and effect by creating visual models in the Ocean, Atmosphere, and Climate Modeling Tool (Climate Change)

Standards: Content

MS-ESS2-1	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
MS-ESS2-2	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
MS-ESS2-3	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
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 motions and complex interactions of air masses result 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.

Standards: Interdisciplinary

Assessment Evidence

Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Warm Ups, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research
Summative	In correlation with the NJSLS, students must demonstrate the following as summative assessments: MS-ESS2-2., Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. MS-ESS2-3., Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. 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 motions and complex interactions of air masses result 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. Other summative assessments will include but are not limited to: lesson activities, summative tests, lab skills, demonstrations, and vocabulary quizzes.
Alternative &	Alternative - Read to the student and chart oral responses. Word banks, sentence frames,

Benchmark	oral responses, graphic organizers, observations, portfolios of student work, orally administered assessments, and anecdotal notes. Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments
Assessment Evidence Resource	

Instructional Resources

Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Amplify Digital Curriculum, Generation Genius, BrainPop, Mystery Science, Microsoft 365, Primary and Secondary Source Documents, Lab Materials as needed, Amplify Readings, Labs, Simulations

Instructional Resource List

Curricular Mandates

Below are the curricular requirements as defined in NJ Administrative Code and Statute

	Amistad		Diversity, Equity, and Inclusion
	Holocaust		LGBT and Disabilities (Grades 6-12)
X	Climate Change		Asian American & Pacific Islander

Social Emotional Learning (SEL) Competencies

NJ Social and Emotional Learning Competencies & Sub-Competencies

	Self-Awareness		Relationship Skills
X	Responsible Decision-Making		Social Awareness
	Self-Management		

21st Century Skills & Themes

X	Global and Cultural Awareness		Technology Literacy		Planning and Budgeting
X	Creativity and Innovation		Financial Institutions		Risk Management and Insurance
X	Information and Media Literacy		Digital Citizenship		Economic and Government Influences
X	Critical Thinking and Problem Solving		Credit Profile		Career Awareness and Planning
	Civic Financial Responsibility		Financial Psychology		