Unit 6 - Weather Patterns

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

Unit Overview

In this unit students will investigate how water vapor, temperature, energy transfer, and wind influence local weather patterns and how these factors can lead to severe rainstorms. Using physical models, a digital simulation, and hands-on activities as well as information gathered from data and science texts, students will investigate the mechanisms by which a warm weather rainstorm can be generated, through the lens of energy transfer.

Enduring Understandings

Rain can happen when an air parcel cools and loses energy.
The loss of energy causes water vapor in the air parcel to condense and fall as rain.
A warmer air parcel has more energy, so it can rise higher into the troposphere and lose more energy, which can result in a greater amount of rain.
Wind can push an air parcel higher into the troposphere causing the air parcel to lose more energy, which can result in a greater amount of rain.

Essential Questions

What is a meteorologists?
What makes rain happen?
What causes an air parcel to cool?
What determines how much an air parcel will cool?
How can wind affect the cooling of an air parcel?

Learning Objectives

Use the Weather Patterns Simulation and see the air parcel temperature change as the parcel continues to rise until it reaches stability with the surrounding air.
Use the Sim to investigate how liquid water becomes water vapor.
Use the Sim to observe what happens when water vapor cools.
Use plastic bags to create models of air parcels to observe the process of condensation.
Discuss the factors that influence the severity of a rainstorm.
Read an informational text about cloud formation that describes how an air parcel loses energy until it becomes stable with the surrounding temperature.
Write to explain how air parcels change temperature as they rise until the temperature becomes stable with the surrounding temperature.

Use the Sim to investigate the connections between energy transfer and the size of a rainstorm.
Use the Sim to observe how the initial temperature of an air parcel affects its final height.
Use the Sim to investigate how the temperature of air can affect the amount of rain.
Explain how the Earth is impacted because of changes in weather patterns (Climate Change)

Standards: Content

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-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. 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. MS-ESS3-2., Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. Other summative assessments will include but are not limited to: lesson activities, summative tests, lab skills, demonstrations, and vocabulary quizzes.
Alternative & Benchmark	Alternative - Read to the student and chart oral responses. Word banks, sentence frames, 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		Credit Profile		Career Awareness and Planning

	Solving				
	Civic Financial Responsibility		Financial Psychology		