3rd Grade Unit 4 - Wild Weather, Changing Climates

Content Area: **Science**
Course(s): **Science Grade 3**
Time Period: **MP4**
Length: **25 days**
Status: **Published**

NJSLS - Science

3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
3-ESS2-2	Obtain and combine information to describe climates in different regions of the world.
3-ESS3-1	Make a claim about the merit of a design solution that reduces the impacts of climate change and/or a weather-related hazard.

Science and Engineering Practices

Analyzing and Interpreting Data

Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1)

Obtaining, Evaluating, and Communicating Information

Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2)

Engaging in Argument from Evidence

Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-ESS3-1)

Asking Questions and Defining Problems

Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)

Planning and Carrying Out Investigations

Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3)

Constructing Explanations and Designing Solutions

Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)

Disciplinary Core Ideas

ESS2.D: Weather and Climate

Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)

Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over the years. (3-ESS2-2)

ESS3.B: Natural Hazards

A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1)

ETS1.A: Defining and Delimiting Engineering Problems

Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1)

ETS1.B: Developing Possible Solutions

Research on a problem, such as climate change, should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2)

At whatever stage, communicating with peers about proposed solutions is an important part of the design

process, and shared ideas can lead to improved designs. (3-5-ETS1-2)

Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5- ETS1-3)

ETS1.C: Optimizing the Design Solution

Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)

Crosscutting Concepts

Patterns

Patterns of change can be used to make predictions. (3-ESS2-1, 3-ESS2-2)

Cause and Effect

Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1)

Influence of Engineering, Technology, and Science on Society and the Natural World

Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). (3-ESS3-1, 3-5-ETS1-2)

People’s needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1)

Science is a Human Endeavor

Science affects everyday life. (3-ESS3-1)

Rationale and Transfer Goals

In this unit, students embark on a journey to understand the dynamic systems of Earth's atmosphere and how weather shapes human lives. Students begin by acting as meteorologists, collecting and analyzing local weather data to identify seasonal patterns and make predictions. They then scale up their perspective from daily weather to global climate, researching and comparing different climate zones around the world to understand why various regions experience vastly different environmental conditions. Applying what they have learned about weather and climate patterns, students shift into the role of engineers. They investigate natural hazards (such as hurricanes, floods, and severe winter storms) and evaluate the merit of various design solutions, such as lightning rods, seawalls, or wind-resistant structures, to determine how communities can protect themselves from extreme weather.

Enduring Understandings

Weather isn't completely random; it behaves in cycles and patterns that we can measure, record, and use to predict the future.

Daily weather and regional climate are related, but they exist on completely different scales of time and geography.

While we cannot stop natural hazards from happening, we can use our understanding of weather patterns to design smart solutions that protect our communities.

Essential Questions

How can we use past weather patterns to predict future weather?

What is the difference between daily weather and a region's climate?

How can human engineering and design reduce the impact of hazardous weather?

Content - What will students know?

- The specific tools used to measure weather, including thermometers (temperature), rain gauges (precipitation), anemometers (wind speed), and wind vanes (wind direction).

- How to distinguish between temperature, precipitation, wind speed, and wind direction.
- That weather changes in predictable cycles throughout the four seasons, and that past seasonal data is the key to predicting future weather in a specific area.
- That weather is the local, day-to-day condition of the atmosphere (short-term), whereas climate is the average weather pattern of a region over a long period of time (typically 30+ years).
- The general characteristics of Earth's major climate zones (e.g., polar is consistently cold/dry, tropical is consistently warm/wet, and temperate has moderate, changing seasons).
- That a region's location on Earth (especially its distance from the equator) determines its climate.
- The characteristics and dangers of local and global natural hazards, such as hurricanes, tornadoes, blizzards, lightning storms, and floods.
- How severe weather physically affects communities, buildings, and the environment.
- The existence and purpose of real-world engineered designs used to reduce weather damage.

Skills - What will students be able to do?

- Create and organize weather data using tables, bar graphs, pictographs, and climate graphs.
- Analyze local weather data over time to describe typical seasonal conditions and identify repeating patterns.
- Use recorded weather patterns to make evidence-based predictions about future weather in their area.
- Obtain and combine information from various grade-appropriate sources (such as maps, informational texts, and videos) about different global climates.
- Compare the climate conditions of two or more distinct regions on Earth (e.g., contrasting the temperate climate of New Jersey with a polar or tropical climate).
- Communicate how a region’s general weather patterns stay consistent year after year, even as daily weather shifts.
- Define the specific problems and damage caused by a particular weather hazard (like high winds or flooding).
- Evaluate the merit of a design solution (such as building houses on stilts, installing lightning rods, or constructing sea walls).
- Write or verbally present a claim explaining why a specific design solution is effective at reducing the impact of a natural hazard, using scientific evidence to back up their thinking.

Activities - How will we teach the content and skills?

- Mystery Science Stormy Skies Anchor Phenomenon
- Mystery Science Stormy Skies Lesson 1
- Mystery Science Stormy Skies Lesson 2
- Mystery Science Stormy Skies Lesson 3
- Mystery Science Stormy Skies Lesson 4
- Mystery Science Stormy Skies Lesson 5
- Whole group instruction and discussion.
- Read Alouds
- Group and Individual Projects
- Hands-on discovery when possible; creating models
- Webquests/Internet “field trips”

Formative Assessments

- Mystery Science Stormy Skies Lesson 1 Assessment
- Mystery Science Stormy Skies Lesson 2 Assessment
- Mystery Science Stormy Skies Lesson 3 Assessment
- Mystery Science Stormy Skies Lesson 4 Assessment
- Mystery Science Stormy Skies Lesson 5 Assessment
- Teacher Observation
- Student projects/models
- Exit Tickets

Summative Assessments

- Mystery Science Stormy Skies Performance Task

- Mystery Science Stormy Skies Unit Assessment
- Tests/Quizzes
- Grade 3 Science Benchmark #4

Spiraling for Mastery

Content or Skill for this Unit	Spiral Focus from Previous Unit	Instructional Activity
• People record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. • Climate describes the range of an area's typical weather conditions and the extent to which those conditions vary over years.	Kindergarten: Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. Kindergarten: Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. Kindergarten: Asking questions, making observations, and gathering information are helpful in thinking about problems. (secondary)	K-ESS2-1 Activities

Key Resources

Mystery Science

Weather and Science Content for Teens and Kids

NOAA Education Resources

NGSS Core Ideas Earth's Systems

NSTA Learning Center

Career Readiness, Life Literacies, & Key Skills

9.4.5.CI.1	Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions (e.g., W.4.6, 3.MD.B.3,7.1.NM.IPERS.6).
9.2.5.CAP.1	Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
9.1.5.CR.1	Compare various ways to give back and relate them to your strengths, interests, and other personal factors.
9.4.5.CI.2	Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7).
9.2.5.CAP.3	Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
9.2.5.CAP.4	Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
9.4.5.DC.4	Model safe, legal, and ethical behavior when using online or offline technology (e.g., 8.1.5.NI.2).
9.4.5.DC.8	Propose ways local and global communities can engage digitally to participate in and promote climate action (e.g., 6.3.5.GeoHE.1).
9.4.5.IML.2	Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3).
9.4.5.IML.3	Represent the same data in multiple visual formats in order to tell a story about the data.
9.4.5.TL.2	Sort and filter data in a spreadsheet to analyze findings.
9.4.5.TL.3	Format a document using a word processing application to enhance text, change page formatting, and include appropriate images graphics, or symbols.

Interdisciplinary Connections

RI.CR.5.1	Quote accurately from an informational text when explaining what the text says explicitly and make relevant connections when drawing inferences from the text.
RI.MF.5.6	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears.

RI.CT.5.8	Compare and contrast the authors' approaches across two or more informational texts within the same genre or about texts on the same or similar topics.
RI.CR.3.1	Ask and answer questions and make relevant connections to demonstrate understanding of an informational text, referring explicitly to textual evidence as the basis for the answers.
W.WR.5.5	Establish a central idea about a topic, investigation, issue or event and use several sources to support the proposed central idea.
W.SE.5.6	Gather relevant information from multiple valid and reliable print and digital sources; summarize or paraphrase information in notes and finished work, making note of any similarities and differences among ideas presented; and provide a list of sources.
W.WR.3.5	Generate questions about a topic and independently locate related information from at least two reference sources (print and non-print) to obtain information on that topic.
W.SE.3.6	Use discussion, books, or media resources to gather ideas, outline them, and prioritize the information to include while planning to write about a topic.