

7 Science Unit 1: Weather & Climate

Content Area: **Science**
Course(s):
Time Period: **Marking Period 1**
Length: **9 Weeks**
Status: **Published**

Unit Overview

The Atmosphere and Energy

Adventurers who brave extreme weather conditions to trek across California's scorching Death Valley and Antarctica's frozen surface must be prepared. The Extreme Adventures Company has hired you to design equipment for these adventurers to help them stay healthy and safe.

Weather

You are part of a team working for the National Oceanic and Atmospheric Administration (NOAA). Your task is to develop instruments for measuring atmospheric conditions, interpret weather maps, make weather forecasts, issue severe weather warnings, and create severe weather action plans.

Climate

The major impacts of the rise in average global temperature include: rising sea level, changing weather patterns, and disruption of ecosystems. Design a plan to mitigate and/or adapt to one of these aspects of climate change.

Standards

Science and Engineering Practices

- Analyzing and Interpreting Data
- Asking Questions and Defining Problems
- Constructing Explanations and Designing Solutions
- Developing and Using Models
- Engaging in Argument from Evidence
- Obtaining, Evaluating, and Communicating Information
- Planning and Carrying Out Investigations
- Using Mathematics and Computational Thinking

Crosscutting Concepts

- Cause and Effect
- Patterns
- Scale, Proportion, and Quantity
- Stability and Change

- Structure and Function
- Stems and System Models

SCI.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.MS-ETS1-2	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
SCI.MS-ETS1-1	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
SCI.MS-ETS1-4	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
SCI.MS-ETS1-3	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
SCI.MS-PS3-4	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
SCI.MS-PS3-5	Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
SCI.MS-PS3-3	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

Materials

Core Materials:

- TCI Weather & Climate Text and Online Resources
 - The Atmosphere and Energy
 - Weather
 - Climate
- Teacher Created Labs

Supplemental Materials:

- [Gizmos](#)
- [BrainPop resources](#)
- [GRC Lessons](#)
- [Nearpod Activities](#)

Technology

CS.6-8.8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.
CS.6-8.8.2.8.ED.2	Identify the steps in the design process that could be used to solve a problem.

CS.6-8.2.8.ED.3	Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
TECH.9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
TECH.9.4.8.IML.1	Critically curate multiple resources to assess the credibility of sources when searching for information.

Evidence of Learning/Assessment

Formative Assessment

- Teacher Observation
- Quizzes
- Exit Tickets
- Labs

Summative Assessment

- Unit Tests
- Benchmark Tests
- Alternative Assessments: Performance Tasks & Projects

Accommodations & Modifications

Special Education

Follow IEP Plan which may contain some of the following examples...

- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe
- Newsela leveled reading passages

504

Follow 504 Plan which may contain some of the following examples...

- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe

ELL

- Translation device/dictionary
- In class/pull out support with ESL teacher
- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe

At-risk of Failure

- Extra time during intervention
- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe

Gifted & Talented

- Independent projects
- STEM Projects

Interdisciplinary Connections

Connections to NJSLS - English Language Arts

Reading

- RI.7.1. Cite several pieces of textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.
- RI.7.2. Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.
- RI.7.7. Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. RI.6.8. Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.
- RI.7.9. Compare, contrast and reflect on (e.g. practical knowledge, historical/cultural context, and background knowledge) one author's presentation of events with that of another (e.g., a memoir written by and a biography on the same person).

Writing

- W.7.1. Write arguments to support claims with clear reasons and relevant evidence.
- W.7.2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

Connections to NJSLS - Mathematics

Math Practices

- Make sense of problems and persevere in solving them.
- Construct viable arguments and critique the reasoning of others.
- Use appropriate tools strategically.

Connections to NJSLS - Social Studies

Social Studies Practices

Developing Questions and Planning Inquiry

Developing Claims and Using Evidence

Presenting Arguments and Explanations

Engaging in Civil Discourse and Critiquing Conclusions

Taking Informed Action

Social Studies Performance Standards

- 6.2.8.GeoHE.4.c: Explain how the geographies and climates of Asia, Africa, Europe, and the Americas influenced their economic development and interaction or isolation with other societies.

Career Readiness, Life Literacies, and Key Skills

TECH.9.4.8.DC.1	Analyze the resource citations in online materials for proper use.
TECH.9.4.8.TL.1	Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.
TECH.9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
TECH.9.4.8.IML.12	Use relevant tools to produce, publish, and deliver information supported with evidence for an authentic audience.

Career Ready Practices

- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.
- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using cultural global competence