

# Unit 1: Weather Patterns and Human Impact

## 6<sup>th</sup> Grade Honors Science

14 Class Meetings

*Revised May 2024*

### Essential Questions

- What factors influence weather conditions?
- How do humans monitor, track, and predict weather?
- How does human activity contribute to climate change?

### Enduring Understandings with Unit Goals

**EU 1: Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.**

- Explain the importance of water and its phases of matter.
- Examine how pressure systems affect weather patterns.

**EU 2: Use models to represent systems and their interactions within systems.**

- Examine how models and instruments aid in predicting weather forecast and outcomes.
- Explain how natural phenomena allow for reliable predictions, while others occur suddenly.
- Explain how the atmosphere impacts weather.

**EU 3: Predict patterns of interactions among organisms across multiple ecosystems.**

- Explain global warming and how humans' impact changes within their environments.
- Investigate how physical or biological components of an ecosystem affect populations.
- Analyze design solution for maintaining biodiversity and ecosystem services.

### Standards

#### Next Generation:

- **MS-LS2-1:** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- **MS-LS2-3:** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystems.
- **MS-LS2-4:** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- **MS-LS2-2:** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- **MS-LS2-5:** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
- **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.
- **6-ESS3-4:** Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- **6-ESS3-5:** Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

#### Common Core State Standards:

- **RI 6.1:** Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- **RI 6.3:** Analyze in detail how key individuals, events, or ideas are introduced, illustrated, and elaborated in a text.

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- **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.
- **W 6.1:** Write arguments to support claims with clear reasons and relevant evidence.
- **W 6.2:** Write informative/explanatory texts to examine and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
- **RST.6-8.:** Cite specific textual evidence to support analysis of science and technical texts.
- **RST.6-8.9:** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
- **6.NS.C.5:** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

### ISAAC Vision of the Graduate Competencies

**Competency 1:** Write effectively for a variety of purposes.

**Competency 2:** Speak to diverse audiences in an accountable manner.

**Competency 3:** Develop the behaviors needed to interact and contribute with others on a team.

**Competency 4:** Analyze and solve problems independently and collaboratively.

**Competency 5:** Be responsible, creative, and empathetic members of the community.

### Unit Content Overview

#### 1. The Atmosphere

- Explain the flow of energy.
- Define climate and its roll within weather.
- Compare and contrast heating and cooling.

#### 2. Weather Patterns

- Explore states of matter with water.
- Explore how weather is tracked, measured, and predicted.
- Explain the use of natural energy's impact on Earth's climate.
- Analyze temperature change and assess its relationship to fossil fuels.
- Compare and contrast variances in climate, weather, and temperature over Earths history.

#### 3. Weather Forecasting

- Show how air masses move.
- Diagram air pressure and the impact on weather.
- Interpret weather fronts.
- Examine weather mapping.

**Key Terms and Vocabulary:** weather, atmosphere, location, unstable, climate, global warming, exosphere, thermosphere, mesosphere, stratosphere, troposphere, humidity, ozone layer, greenhouse effect, fronts, barometer, thermometer, anemometer, hygrometer, weather balloon, rain gauge, low pressure, high pressure, stationary, climate zone, tropical, dry, temperate, continental, polar, extreme, average

**Interdisciplinary Connection:**

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Language Arts, Math, Humanities

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### Daily Learning Objectives with TWPS

#### Students will be able to...

- Determine what weather is and types of weather.
  - *What words would you use to define weather?*
- Investigate how weather is measured and predicted.
  - *What are the ways that weather can be reported?*
- Examine how weather fronts impact daily weather patterns.
  - *What causes various types of weather?*
- Investigate how the atmosphere impacts weather types. \*\*
  - *What are the main gases in the atmosphere and how do they influence weather patterns?*
  - *How do scientists study the atmosphere, and what tools do they use to collect data?*
- Investigate climate zones and their impact on weather patterns. \*\*\*
  - *What is the difference between weather and climate and how are they related?*
  - *How do climate types differ around the world and how do they impact the people and animals that live there?*
  - *What factors influence climate zones?*
- Determine types of extreme weather and how they impact communities. \*\*
  - *How do extreme weather events impact communities?*
  - *How have the ways that meteorologists track and predict extreme weather events changed?*
- Investigate the impact that humans have on climate change. \*\*\*
  - *How do humans contribute to changes in the atmosphere?*
  - *How have human activities influenced weather patterns?*
  - *What impacts do climate change have on ecosystems?*

### Instructional/ ELL Strategies/Differentiated Instruction

- Power Point Lecture with notetaking
- Guided notetaking
- Warm up activities
- Flexible grouping
- Independent reading
- Lab activities
- Exit slips
- Graphic Organizers
- Creating authentic connections for students
- Vocabulary word bank
- Rephrasing and restatement of information and concepts
- Tiered instruction
- Alternative test settings

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- Reading and accountable talk discussions of texts
- Student-led instruction
- Homework assignments
- Hands-on activities
- SIOP strategies- Teachers implement SIOP strategies to introduce academic vocabulary and use multiple modes of representation including gestural, oral, pictorial, graphic and textural.

**Assessments**

**FORMATIVE ASSESSMENTS:**

- Do It Now Activities
- Guided notes
- Homework
- Daily Think-Write-Pair-Share (TWPS) Activities
- Accountable Talk Discussions
- Oral questioning
- Exit slips
- Warm Up activities
- Close reading and interpretation of text
- Performance Task – “Countries of the World” Brochure
  - Literacy Rubric/Teacher Scoring Rubric

**SUMMATIVE ASSESSMENTS:**

- Quiz on EU 1
- Quiz on EU 2
- Performance Task – Travel Brochure

**Unit Task**

**Unit Task Name:** Unit Task Name: “Countries of the World” Brochure

**Description:** Students will design a well-crafted, evidence-based travel brochure and persuasive paragraph that contains information about the climate, weather patterns, and impacts on environment for a specific country. Students will describe the location, weather patterns, and climate types of the chosen country (EU1). The brochure will present examples of human-environmental interaction and impacts on the weather and climate (EU3). Students will present their travel brochure with a persuasive speech.

**Evaluation:** Literacy Rubric Assessment / Teacher Scoring Rubric

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### **Unit Resources**

- Non-Fiction Text
- Internet databases
- Large format poster printer
- Google Slides
- Google Classroom
- Interactive Notebook
- NOAA website
- Lab materials
- Non-fiction articles