Marietta City Schools

District Unit Planner

Everything on the unit planner must be included on the unit curriculum approval statement.

Science Grade 6 Advanced Studies

Unit title	*Climate and Weather*	**MYP year**	1	**Unit duration (hrs)**	40 Hours

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GSE Standards

Standards

S6E4. Obtain, evaluate, and communicate information about how the sun, land, and water affect climate and weather.

a. Analyze and interpret data to compare and contrast the composition of Earth's atmospheric layers (including the ozone layer) and greenhouse gases. (Clarification statement: Earth's atmospheric layers include the troposphere, stratosphere, mesosphere, and thermosphere.)

b. Plan and carry out an investigation to demonstrate how energy from the sun transfers heat to air, land and water at different rates. (Clarification statement: Heat transfer should include the processes of conduction, convection, and radiation.)

c. Develop a model demonstrating the interaction between unequal heating and the rotation of the Earth that causes local and global wind systems.

d. Construct an explanation of the relationship between air pressure, weather fronts, and air masses and meteorological events such as tornadoes and thunderstorms.

e. Analyze and interpret weather data to explain the effects of moisture evaporating from the ocean on weather patterns and weather events such as hurricanes.

S6E6. Obtain, evaluate, and communicate information about the uses and conservation of various natural resources and how they impact the Earth.

b. Design and evaluate solutions for sustaining the quality and supply of natural resources such as water, soil, and air.

c. Construct an argument evaluating contributions to the rise in global temperatures over the past century. (Clarification statement: Tables, graphs, and maps of global and regional temperatures, and atmospheric levels of greenhouse gases such as carbon dioxide and methane, should be used as sources of evidence.)

S6E3. Obtain, evaluate, and communicate information to recognize the significant role of water in Earth processes.

d. Analyze and interpret data to create graphic representations of the causes and effects of waves, currents, and tides in Earth's systems.

Prior Student Knowledge: (REFLECTION – PRIOR TO TEACHING THE UNIT)

In fourth grade, students investigate the following:

S4E3. Obtain, evaluate, and communicate information to demonstrate the water cycle.

a. Plan and carry out investigations to observe the flow of energy in water as it changes states from solid (ice) to liquid (water) to gas (water vapor) and changes from a gas to liquid to solid.

b. Develop models to illustrate multiple pathways water may take during the water cycle (evaporation, condensation, and precipitation). (Clarification statement: Students should understand that the water cycle does not follow a single pathway.)

S4E4. Obtain, evaluate, and communicate information to predict weather events and infer weather patterns using weather charts/maps and collect weather data.

a. Construct an explanation of how weather instruments (thermometer, rain gauge, barometer, wind vane, and anemometer) are used in gathering weather data and making forecasts.

b. Interpret data from weather maps, including fronts (warm, cold, and stationary), temperature, pressure, and precipitation to make an informed prediction about tomorrow's weather.

c. Ask questions and use observations of cloud types (cirrus, stratus, and cumulus) and data of weather conditions to predict weather events.
d. Construct an explanation based on research to communicate the difference between weather and climate.

Gifted Standards

Stand 1: Advanced Research Skills: Students will develop and utilize advanced research skills among various topics.
Strand 2: Creative Thinking Skills: Students will develop and utilize creative thinking through a variety of products and problem solving.
Strand 3: Higher Order Thinking and Problem- Solving Skills: Students will develop and utilize critical thinking, higher order thinking, logical thinking and problem solving skills in various situations.
Strand 4: Advanced Communication and Collaboration Skills: Students will develop advanced communication and collaboration skills in working toward a common goal with shared accountability for the final outcome.
Strand 5: Emotional Development of Self: Students will develop understanding of self and how one's own unique abilities influence interactions with others.
Strand 6: Self-directed Learner: Students will become self-directed, independent-learners.

Concepts/Skills to be Mastered by Students

- Waves and Currents
- Ocean and atmosphere patterns
- Weather
- Climate
- Water Cycle
- Air masses
- Unequal heating and rotation of Earth
- Natural hazards
- Global climate change

Key Vocabulary: (KNOWLEDGE & SKILLS)

Meteorological, Local Winds, Land breeze, Sea breeze, Global Winds, Air Mass, Air Pressure, Maritime, Continental, Polar, Tropical, Convection Current, Coriolis effect, Easterlies, Westerlies, Doldrums, Horse Latitudes, Trade Winds, Jet Stream, ocean currents, Coriolis Effect, Humidity, Storm Surge, Eye, Eye Wall, Low-Pressure Center, Fronts (cold, warm, stationary, occluded), Thunderstorm, Funnel Cloud, Updraft, Downdraft, Vortex, Rotation

Year-Long Anchoring Phenomena: (LEARNING PROCESS)

Earth is the only planet in our solar system that is able to support life.

Unit Phenomena (LEARNING PROCESS)

Why do different parts of the Earth experience different climates?

Possible Preconceptions/Misconceptions: (REFLECTION – PRIOR TO TEACHING THE UNIT)

Meteorologists know exactly what weather we will experience.
The higher you go up a mountain the more air pressure you will experience.
Cold air rises, and warm air sinks.
Tornadoes are more deadly than hurricanes.

Key concept	Related concept(s)	Global context
Systems Systems are sets of interacting or interdependent components. Systems provide structure and order in human, natural and built environments. Systems can be static or dynamic, simple or complex.	Environment (MYP) Patterns (MYP/CCC)	**Scientific and Technical Innovation** Students will explore the natural world and its laws; the interaction between people and the natural world; how humans use their understanding of scientific principles; the impact of scientific and technological advances on communities and environments; the impact of environments on human activity; how humans adapt environments to their needs.

Statement of inquiry

Innovations and advancements in science and technology allow meteorologists to identify patterns and more accurately predict weather systems.

Inquiry questions

Factual—
What is the difference between local and global winds?
Explain the effects of moisture evaporating from the ocean on weather patterns.
Explain the relationship between air pressure, weather fronts, and air masses.

Conceptual—
How does unequal heating create local and global winds?
Compare and contrast Earth's atmospheric layers.
How does energy from the sun transfer heat to air, land, and water?

Debatable-
Should meteorologists be held responsible for inaccurate weather forecasts?

MYP Objectives	Assessment Tasks	
*What specific MYP **objectives** will be addressed during this unit?*	***Relationship** between summative assessment task(s) and statement of inquiry:*	*List of common formative and summative assessments.*

MYP C- Processing and Evaluating	MYP A/C- Safest Storm to Encounter MYP D- Climate Crisis Reflections and Solutions	**Formative Assessment(s):** ● CFA- Atmospheric Layers **Summative Assessment(s):** MYP A/C- Safest Storm to Encounter MYP D- Climate Crisis Reflections and Solutions Capstone Presentations

Approaches to learning (ATL)
Critical Thinking: Use models and simulations to explore complex systems and issues **Research:** Collect and analyze data to identify solutions and make informed decisions. **Collaboration:** Working effectively with others.

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
S6E4. Obtain, evaluate, and communicate information about how the sun, land, and water affect climate and weather. a. Analyze and interpret data to compare and contrast the composition of Earth's atmospheric layers (including the ozone layer) and greenhouse gases.	**History of Earth's Atmosphere-** Students will analyze the history of earth's atmosphere by examining the relative carbon dioxide and carbon gases at different times in history and the role of living organisms in determining the composition of the atmosphere.	● Capstone Connections ● Choice with product creation
S6E6. Obtain, evaluate, and communicate information about the uses and conservation of various natural resources and how they impact the Earth. c. Construct an argument evaluating contributions to the rise in global temperatures over the past century.	**Global Warming**- The students analyze graphs of historical data relating to global warming and climate change examining the influence of both natural and human related factors. Construct an argument evaluating contributions to the rise in global temperatures over the past century. (Paper II argumentative writing)	

Content Resources
Edpuzzle content videos, Discovery Education Science Techbook
Capstone Connections Through global warming students will learn about their role and impact on maintaining a sustainable earth. Students will create the presentation of their Capstone Project and present it to the class.