Unit 2: Earth Science- Water and Climate

Content Area: **Science**
Course(s):
Time Period: **Trimester 2**
Length: **10-12 weeks**
Status: **Published**

Summary

In this unit of study, students will engage in ideas about water and weather in diverse climates and the effects on climate change. Students will learn how water is involved in weather and the different weather conditions around the world and throughout the year. They will make real world connections as they learn how humans use water as a natural resource. Students will also explore the different properties of water, interaction between water and other earth materials, and the water cycle. Students will make observations about weather and collect data. They will use various tools to measure water in its different forms. Students will apply their understanding of weather-related hazards, in order to make a claim about the merit of a design solution that reduces the impacts of such hazards. The crosscutting concepts of patterns, cause and effect, and the influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. This unit will be taught utilizing Earth Science Water and Climate FOSS kit.

Revised Date: July 2026

Essential Questions/ Enduring Understandings

Essential Questions:

- What is weather?
- How is water involved in weather?
- How does temperature affect water and weather?
- How can we predict weather patterns throughout the year?
- How are people affected by climates and climate changes around the world?
- How do natural disasters happen and how can people protect themselves from these dangers?

Enduring Understandings:

- Water is one of the most important substances on earth. It makes up the majority of earth's surface.
- Climate is the typical weather that can be expected to occur in a region based on long term observations. Weather is the condition of the atmosphere now.
- Scientists observe and record patterns of weather across different regions to make predictions about future weather.
- Weather-related natural hazards such as tornadoes, hailstorms, blizzards, lightning, floods, and drought can occur. Although humans cannot prevent or eliminate these natural hazards, they can take steps to reduce the impact.
- Students will also understand human impacts on climate change and how to reduce those impacts.

Objectives

Students will know…

- How water interacts with different surfaces
- Temperature affects water and weather
- How condensation and evaporation are part of the water cycle
- The typical weather conditions in our region and how they change throughout the year
- Patterns can be used to predict change
- Design solutions can reduce the impacts of weather related hazards and climate change
- Rainwater drains differently through different earth materials

Students will be skilled at…

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating and communicating information

Learning Plan

- FOSS Water and Climate kit- Required investigations as follows:
    - Investigation 1 Part 4

      Investigation 2 Part 1

      Investigation 3 Part 1

      All of Investigation 4 (Parts 1-3)

      All of Investigation 5 (Parts 1-3)
- Preview the essential questions and connect learning throughout the unit
- Gain students understanding and prior knowledge of water and climate
- Read literature about water and climate
- Explore how water interacts with other materials
- Compare the way water interacts with different surfaces
- Compare the rate of water flow on different slopes using different amounts of water

- Explore how temperature affects the state and density of water
- Use tools to observe and measure temperature
- Compare the density of water when it is heated and cooled
- Observe and collect local weather data, compare it to weather forecast data and historical weather data
- Explore the effects of climate change
- Explore the transformation of water between a liquid and gas known as condensation and evaporation
- Discuss how condensation and evaporation are a part of the water cycle
- Discuss the difference between weather (current conditions) and climate (typical weather in a specific region)
- Notice patterns to analyze and interpret weather data, and use this data to determine cause-and-effect relationships
- Explore how water drains through soil
- Compare what happens when water is drained through soil and gravel
- Discuss renewable natural resources and ways to conserve them
- Watch videos of water and climate, allow students to make connections
- Maintain observational journals with student note taking and drawings of investigations
- Incorporate literature about water and climate, make connections to everyday life and the environment

Optional Engineering Design Challenge (Lesson plan provided in "Materials" section

Assessment

Science is designed to promote skill attainment. Student progression and pace through which they proceed through the performance tasks is based on their affinity for and ability to reach skill attainment. The teacher will determine formative and summative skill attainment; alternative assessments will be incorporated for each student based on their strengths and challenges.

Formative: Teacher observation, student responses during lessons

Summative: FOSS investigation checklist, science notebook (response to focus questions)

Benchmark: I-Check Assessments, science notebook

Alternative: Oral presentation, student produces projects

Investigation 1.1 FQ: What happens when water falls on different surfaces?

Investigation 1.2 FQ: How does water move on a slope?

Investigation 1.3 FQ: How much water can a dry sponge soak up? (optional)

Investigation 1.4 FQ: What is the effect of rain on natural materials?

Investigation 2.1 FQ: How can you measure temperature accurately?

Investigation 2.2 FQ: What is the effect on water when it gets hot? cold? (optional)

Investigation 2.3 FQ: What happens when hot or cold water is put into room temperature water? (optional)

Investigation 2.4 FQ: How does water change when it gets really cold?

Investigation 3.1 FQ: What does the weather forecast tell us?

Investigation 3.2 FQ: What happens to wet paper towels overnight?

Investigation 3.3 FQ: How does surface area affect evaporation? (optional)

Investigation 3.4 FQ: What else affects how fast water evaporates? (optional)

Investigation 3.5 FQ: What causes moisture to form on the side of a cup? (optional)

Investigation 4.1 FQ: What are typical weather conditions in our region?

Investigation 4.2 FQ: How do we describe different climates?

Investigation 4.3 FQ: How do people deal with natural hazards such as floods?

Investigation 5.1 FQ: What happens when water is mixed with other earth materials?

Investigation 5.2 FQ: Do soils in the schoolyard drain water at the same rate?

Investigation 5.3 FQ: What is needed to make a waterwheel system function well?

Standards

P.1	Act as a responsible and contributing community members and employee.
	An individual's passions, aptitude and skills can affect his/her employment and earning potential.
9.2.5.CAP.1	Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
P.3	Consider the environmental, social and economic impacts of decisions.
P.4	Demonstrate creativity and innovation.
P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
P.6	Model integrity, ethical leadership and effective management.
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.

P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
P.9	Work productively in teams while using cultural/global competence.
L.RF.3.4.A	Read grade-level text with purpose and understanding.
	Individuals can choose to accept inevitable risk or take steps to protect themselves by avoiding or reducing risk.
9.2.5.CAP.8	Identify risks that individuals and households face.
	There are ways to keep the things we value safely at home and other places.
3-ESS2	Earth's Systems
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	Earth and Human Activity
3.M.A	Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects
3.DL.A	Understand data-based questions and data collection.
3.DL.B	Represent and interpret data
W.IW.3.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
SL.PE.3.1.B	Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
SL.PE.3.1.C	Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.
SL.ES.3.3	Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.
SL.PI.3.4	Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.
3-ESS2	Earth's Systems
3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
	Examples of data could include average temperature, precipitation, and wind direction.
	Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.
	Analyzing and Interpreting Data
	Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
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.
	Patterns
	Patterns of change can be used to make predictions.
3-ESS2-2	Obtain and combine information to describe climates in different regions of the world.

	Obtaining, Evaluating, and Communicating Information
	Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.
ESS2.D	Weather and Climate
	Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years.
	Patterns
	Patterns of change can be used to make predictions.
3-ESS3	Earth and Human Activity
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.
	Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.
	Engaging in Argument from Evidence
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.
	Cause and Effect
	Cause and effect relationships are routinely identified, tested, and used to explain change.

Materials

Core Book List

FOSS Kit: Water and Climate

Brainpop

Discovery Education

Scholastic News

Mystery Science

Science notebook for assessment and journaling

Optional Culminating Enginnering Design Challenge

Integrated Accommodations and Modifications, Special Education students, English Language Learners, At-Risk students, Gifted and Talented students, Career Education, and those with 504'sNew Section

https://docs.google.com/spreadsheets/d/1wsfz0Pa-_IpCYTjT7VkZ-WPaRs7EN8e8qwhobYr1KB0/edit#gid=1426178898