Water and Climate

Content Area: **Science**
Course(s):
Time Period: **Marking Period 1**
Length: **5 weeks**
Status: **Published**

Course Pacing Guide

Unit	MP/Trimester	Weeks
Water and Climate	1	5
Motion and Matter	2	5
Structures of Life	3	5

Unit Overview

Water is the most important substance on Earth. Water dominates the surface of our planet, changes the face of the land, and defines life.

Weather is driven by the Sun and involves the movement of water over the earth through evaporation, condensation, precipitation, and runoff—the water cycle. Climate is determined in part by the amount of precipitation in a region and by temperature fluctuations. Human societies depend on water, and new technologies are being engineered to conserve and protect this natural resource, to provide for the needs of people around the world.

These powerful pervasive ideas are introduced to grade 3 students in the Water and Climate Module. It provides students with experiences to explore the properties of water, the water cycle and weather, interactions between water and other earth materials, and how humans use water as a natural resource.

Enduring Understandings

Unit Enduring Understandings

- Water forms beads on waterproof materials and soaks into absorbent materials.

- Water moves downhill. The angle of the slope and the amount of water affect flow.
- Temperature is a measure of how hot matter is.
- Water expands when heated and contracts when cooled.
- A material that floats in water is less dense than the water; a material that sinks is more dense.
- Cold water is more dense than warm water.
- Water expands when it freezes; ice is less dense than liquid water.
- Ice melts when heated; water freezes when cooled.
- Weather is measured using observations and tools such as thermometers, wind vanes, and rain gauges.
- Evaporation is the process by which liquid (water) changes into gas (water vapor).
- High temperatures, greater surface area, and moving air (wind) increase the rate of evaporation.
- Condensation is the process by which gas (water vapor) changes into liquid water; it occurs on a cool surface.
- Evaporation and condensation contribute to the movement of water through the water cycle.
- Typical weather in a region often varies with seasons. High and low temperatures and amount of precipitation are the main ways to describe seasonal weather changes.
- The Sun's energy drives weather.
- Weather data in tables and in graphic displays, may show patterns over time.
- Climate is the average or typical weather that can be expected to occur in a region, based on long-term observation and data analysis.
- Weather-related natural hazards include tornadoes, hailstorms, blizzards, lightning, floods, and drought.
- People often modify their homes and their way of life to deal with floods.
- Wetland protection and restoration is one way to prevent floods.
- Soil is rock particles mixed with organic material called humus.
- Soils retain more water than rock particles alone.
- Water drains more easily through some earth materials than through others.
- The energy of flowing water can be used to do work; waterwheels are machines powered by flowing water.

Essential Questions

Unit Essential Questions

- What happens when water falls on different surfaces?
- How does water move on a slope?
- How much water can a dry sponge soak up?
- What happens outdoors when rain falls on natural materials?
- How can you measure temperature accurately?
- What happens to water when it gets hot? cold?
- What happens when hot or cold water is put into room-temperature water?
- How does water change when it gets really cold?
- Where should an animal go to stay warm or to stay cool?

- What does the weather forecast tell us?
- What happens to wet paper towels overnight?
- What else affects how fast water evaporates?
- What causes moisture to form on the side of a cup?
- What are typical weather conditions in our region?
- How do we describe different climates?
- How do people deal with natural hazards such as floods?
- What happens when water is mixed with other earth materials?
- Do soils in the schoolyard drain water at the same rate?
- What is needed to make a waterwheel system function well?

New Jersey Student Learning Standards (No CCS)

PS1.A: Structures and properties of Matter

Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (Extended from grade 2)

ESS2.C: The roles of water in Earth's surface processes

Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (Extended from grade 2) Nearly all of Earth's available water is in the ocean. (From grade 5)

ESS3.C: Human impacts on Earth systems

Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (From grade 5)

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. Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years.

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Climate describes a range of an area's typical weather conditions and the extent to which those

conditions vary over years.

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.

ESS3.A: Natural resources

Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (Extended from kindergarten)

ETS1.A: Defining and delimiting engineering problems

Possible solutions 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.

ETS1.B: Developing possible solutions

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.

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

Amistad Integration

Holocaust/Genocide Education

Interdisciplinary Connections

Unit Summary:

Water is the most important substance on Earth. Water dominates the surface of our planet, changes the face of the land, and defines life.

Primary interdisciplinary connections:

ELA/Literacy:

RI: 1: Ask and answer questions.

RI: 1: Ask and answer questions to demonstrate understanding of a text.

RI 2: Determine the main idea of a text.

RI 2: Determine the main idea of a text; recount key details.

RI 3: Describe in a text the steps in technical procedures.

RI 3: Describe the relationship between scientific ideas.

RI 3: Describe the relationship between scientific concepts using language that pertains to cause and effect.

RI 4: Determine the meaning of domain-specific words and phrases in a text.

RI 5: Use text features to locate information.

RI 6: Distinguish their own point of view from that of the author of a text.

RI 7: Use information gained from illustrations to demonstrate understanding of the text.

RI 8: Describe logical connections in text.

RI 9: Compare and contrast two texts on the same topic.

RF 3: Apply word analysis skills in decoding words.

RF 4: Read with fluency, purpose, and understanding.

RF 4: Read with fluency.

RF 4c: Use context to confirm word understandings.

W 2: Write informative texts

W 5: Strengthen writing by revising and editing.

W 7: Conduct a short research project.

W 8 : Gather information from print; take brief notes and sort evidence into categories provided.

SL 1: Engage in collaborative discussions.

SL 2: Determine main ideas and supporting details of information presented in diverse formats.

SL 2: Determine main ideas from information presented orally.

SL 3: Ask and answer questions about speaker's information.

SL 4: Recount an experience.

SL 4: Report on a topic or text.

SL 6: Speak in complete sentences to provide requested details.

L 4: Use glossaries to determine or clarify the precise meaning of key words.

L 4: Determine or clarify the meaning of unknown words.

L 5: Demonstrate understanding of word relationships

L 6: Acquire and use domain-specific words.

Mathematics

MP.2 Reason abstractly and quantitatively. (3-ESS2-1),(3-ESS2-2)

MP.4 Model with mathematics. (3-ESS2-1),(3-ESS2-2)

MP.5 Use appropriate tools strategically. (3-ESS2-1)

3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve

one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent

the problem. (3-ESS2-1)

3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less"

problems using information presented in bar graphs. (3-ESS2-1)

MP.2 Reason abstractly and quantitatively. (3-ESS3-1)

MP.4 Model with mathematics. (3-ESS3-1)

Technology Standards

TECH.8.1.5.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.5.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.5.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.

21st Century Themes/Careers

21st Century Themes:

Digital media will be used incorporated in project presentations. This module will develop students' abilities to do and understand scientific inquiry. Students will identify questions, design and conduct scientific investigations to answer those questions, employ tools to gather, analyze, and interpret data. They will use data to construct reasonable explanations, develop and communicate investigations and evidence and understand that scientists use different kinds of investigations and tools to develop explanations using evidence and knowledge. This module will develop and extend students' understandings about science and technology. Students will work collaboratively in teams and use tools and scientific techniques to make better observations.

Financial Literacy Integration

Instructional Strategies & Learning Activities

Differentiated Instruction

Examples may include:

- Curriculum Map
- Inquiry/Problem-Based Learning
- Learning preferences integration (visual, auditory, kinesthetic)
- Sentence & Discussion Stems
- Tiered Learning Targets
- Learning through play
- Meaningful Student Voice & Choice
- Relationship-Building & Team-Building
- Self-Directed Learning

- Choice Boards
- Debate
- LMS use
- Mock Trial
- The Hot Seat/Role-Play
- Student Data Inventories
- Mastery Learning (feedback toward goal)
- Goal-Setting & Learning Contracts
- Game-Based Learning
- Grouping
- Socratic Seminar
- Genius Hour
- Rubrics
- Learning Menus
- Jigsaws
- Learning Through Workstations
- Concept Attainment
- Flipped Classroom
- Mentoring
- Assessment Design & Backwards Planning
- Student Interest & Inventory Data

*Add or remove any of these as you see fit.

Formative Assessments

- Response Sheets
- Performance Assessments
- Science Notebook Entries

Summative Assessment

- Investigation I-Checks
- Surveys
- Post-Test

Benchmark Assessments

- Investigation I-Checks
- Surveys
- Post-Test

Alternate Assessments

Resources & Technology

Fossweb.com

BOE Approved Texts

FOSS Water and Climate

Closure

- Snowstorm - Students write down what they learned on a piece of scratch paper and wad it up. Given a signal, they throw their paper snowballs in the air. Then each learner picks up a nearby response and reads it aloud.
- Parent Hotline - Give students an interesting question about the lesson without further discussion. Email their guardians the answer so that the topic can be discussed over dinner.
- DJ Summary - Learners write what they learned in the form of a favorite song. Offer to let one or two sing thier summary.
- Gallery Walk - On chart paper, small groups of students write and draw what they learned. After the completed works are attached to the classroom walls, others students affix post-its to the posters to extend on the ideas, add questions.
- Sequence It - create timelines of major events discussed
- Low-Stakes Quizzes - Give a short quiz using technologies like Kahoot or a Google form.
- Have students write down three quiz questions (to ask at the beginning of the next class).
- Question Stems - Have students write questions about the lesson on cards, using question stems framed around Bloom's Taxonomy. Have students exchange cards and answer the question they have acquired.
- Kids answer the following prompts: "What takeaways from the lesson will be important to know three years from now? Why?

- Have students dramatize a real-life application of a skill.
- Ask a question. Give students ten seconds to confer with peers before you call on a random student to answer. Repeat.
- Have kids orally describe a concept, procedure, or skill in terms so simple that a child in first grade would get it.
- Direct kids to raise their hands if they can answer your questions. Classmates agree (thumbs up) or disagree (thumbs down) with the response.
- Have kids create a cheat sheet of information that would be useful for a quiz on the day's topic.
- Kids write notes to peers describing what they learned from them during class discussions.
- Ask students to summarize the main idea in under 60 seconds to another student acting as a well-known personality who works in your discipline. After summarizing, students should identify why the famous person might find the idea significant.
- Have students complete the following sentence: "The [concept, skill, word] is like _____ because _____."
- Ask students to write what they learned, and any lingering questions on an "exit ticket". Before they leave class, have them put their exit tickets in a folder or bin labeled either "Got It," "More Practice, Please," or "I Need Some Help!"
- After writing down the learning outcome, ask students to take a card, circle one of the following options, and return the card to you before they leave: "Stop (I'm totally confused. Go (I'm ready to move on.)" or "Proceed with caution (I could use some clarification on . . .)"

ELL

English Language Development Strategies Used with FOSS

Activating prior knowledge • Inquiry chart • Circle map • Observation posters • Quick write • Kit inventory Using comprehensible input • Multiple exposures • Pictorials • Word/picture cards • Supported reading • Graphic organizers Developing academic knowledge • Language learning objectives • Sentence frames • Words walls • Concept maps • Cognitive content dictionary • Word analysis Oral discourse practice • Think-pair-share • Participation protocols • A/B partner prompts • Teacher and peer feedback • Songs, chants, raps, poems

Special Education

- Shorten assignments to focus on mastery of key concepts.
- Shorten spelling tests to focus on mastering the most functional words.
- Substitute alternatives for written assignments (clay models, posters, panoramas, collections, etc.)
- Specify and list exactly what the student will need to learn to pass.
- Evaluate the classroom structure against the student’s needs (flexible structure, firm limits, etc.).

- Keep workspaces clear of unrelated materials.
- Keep the classroom quiet during intense learning times.
- Reduce visual distractions in the classroom (mobiles, etc.).
- Provide a computer for written work.
- Seat the student close to the teacher or a positive role model.
- Use a study carrel. (Provide extras so that the student is not singled out.)
- Provide an unobstructed view of the chalkboard, teacher, movie screen, etc.
- Keep extra supplies of classroom materials (pencils, books) on hand.
- Maintain adequate space between desks.
- Give directions in small steps and in as few words as possible.
- Number and sequence the steps in a task.
- Have student repeat the directions for a task.
- Provide visual aids.
- Go over directions orally.
- Provide a vocabulary list with definitions.
- Permit as much time as needed to finish tests.
- Allow tests to be taken in a room with few distractions (e.g., the library).
- Have test materials read to the student, and allow oral responses.
- Divide tests into small sections of similar questions or problems.
- Allow the student to complete an independent project as an alternative test.
- Give progress reports instead of grades.
- Grade spelling separately from content.
- Allow take-home or open-book tests.
- Show a model of the end product of directions (e.g., a completed math problem or finished quiz).
- Stand near the student when giving directions or presenting a lesson.
- Mark the correct answers rather than the incorrect ones.
- Permit a student to rework missed problems for a better grade.
- Average grades out when assignments are reworked, or grade on corrected work.
- Use a pass-fail or an alternative grading system when the student is assessed on his or her own growth.

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- adjusted class schedules or grading
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits

- occupational or physical therapy

At Risk

- Use of mnemonics
- Have student restate information
- Provision of notes or outlines
- Concrete examples
- Use of a study carrel
- Assistance in maintaining uncluttered space
- Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
- Peer or scribe note-taking
- Lab and math sheets with highlighted instructions
- Graph paper to assist in organizing or lining up math problems
- Use of manipulatives
- No penalty for spelling errors or sloppy handwriting
- Follow a routine/schedule
- Teach time management skills
- Verbal and visual cues regarding directions and staying on task
- Adjusted assignment timelines
- Visual daily schedule
- Immediate feedback
- Work-in-progress check
- Pace long-term projects
- Preview test procedures
- Film or video supplements in place of reading text
- Pass/no pass option
- Cue/model expected behavior
- Use de-escalating strategies
- Use peer supports and mentoring
- Have parent sign homework/behavior chart
- Chart progress and maintain data

Gifted and Talented

For these students, science instructional strategies should include fast pacing, different levels of challenges, opportunities for self-direction, and strategic grouping

Focus on effort and practice

Offer the Most Difficult First

Offer choice

Speak to Student Interests

Allow G/T students to work together

Encourage risk taking