

## Unit 2: Water Works

### 5<sup>th</sup> Grade Science

35 Class Meetings

*Written July 2025*

#### Essential Questions

- How is water on Earth distributed across different places?
- How can it be proven that matter is not created or destroyed during physical changes?
- How do Earth's systems interact with each other?

#### Enduring Understandings with Unit Goals

##### EU 1: Distribution of Water on Earth

- Most of Earth's water is in the ocean, and only a small percentage is fresh water found in various places.
- Using graphs and data can help us understand where Earth's water is stored and how little is available for human use.

##### EU 2: Conservation of Matter

- When substances are heated, cooled, or mixed, they may change form, but the total amount of matter stays the same.
- Matter is never lost or created, just rearranged.
- We can measure and graph changes in matter to prove that it is not lost.

##### EU 3: Earth's Systems and their Interactions

- Earth's systems are always interacting with one another.
- The interactions between the geosphere, biosphere, hydrosphere, and atmosphere shape our environment.

#### Standards

##### Common Core State and NGSS Standards:

- **5-ESS2-2.** Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.
- **5-PS1-2.** Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
- **5-ESS2-1.** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
- **3-5-ETS1-1.** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- **3-5-ETS1-2.** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- **3-5-ETS1-3.** Plan and carry out fair tests in which variables are controlled, and failure points are considered to identify aspects of a model or prototype that can be improved.
- **CCSS.ELA-Literacy.RI.4.1:** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- **CCSS.ELA-Literacy.RI.4.2:** Determine the main idea of a text and explain how it is supported by key details; summarize the text.

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- **CCSS.ELA-Literacy.RI.4.4:** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a *grade 4 topic or subject area*.
- **CCSS.ELA-Literacy.RI.4.9:** Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.
- **CCSS.ELA-Literacy.W.4.2:** Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- **CCSS.ELA-Literacy.W.4.2.a:** Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
- **CCSS.ELA-Literacy.W.4.2.b:** Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
- **CCSS.ELA-Literacy.W.4.2.c:** Link ideas within categories of information using words and phrases (e.g., *another, for example, also, because*).
- **CCSS.ELA-Literacy.W.4.2.d:** Use precise language and domain-specific vocabulary to inform about or explain the topic.
- **CCSS.ELA-Literacy.W.4.2.e:** Provide a concluding statement or section related to the information or explanation presented.
- **CCSS.ELA-Literacy.W.4.4:** Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience
- **CCSS.ELA-Literacy.W.4.5:** With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.
- **CCSS.ELA-Literacy.W.4.6:** With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in a single sitting.
- **CCSS.ELA-Literacy.W.4.7:** Conduct short research projects that build knowledge through investigation of different aspects of a topic.
- **CCSS.ELA-Literacy.W.4.8:** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information and provide a list of sources.
- **CCSS.ELA-Literacy.W.4.9:** Draw evidence from literary or informational texts to support analysis, reflection, and research.
- **CCSS.ELA-Literacy.SL.4.1:** Engage effectively in a range of collaborative discussions (one-on one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly.
- **CCSS.ELA-Literacy.SL.4.1.a:** Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.
- **CCSS.ELA-Literacy.SL.4.1.b:** Follow agreed-upon rules for discussions and carry out assigned roles.
- **CCSS.ELA-Literacy.SL.4.1.c:** Pose and respond to specific questions to clarify or follow up on information and make comments that contribute to the discussion and link to the remarks of others.

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- **CCSS.ELA-Literacy.SL.4.1.d:** Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.
- **CCSS.ELA-Literacy.SL.4.2:** Paraphrase portions of a text read aloud, or information presented in diverse media and formats, including visually, quantitatively, and orally.
- **CCSS.ELA-Literacy.SL.4.3:** Identify the reasons and evidence a speaker provides to support particular points.
- **CCSS.ELA-Literacy.SL.4.4:** Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

### 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. Water Distribution on Earth

- Explore where water is found on Earth.
- Investigate how water is distributed among oceans, glaciers, groundwater, lakes, and rivers.
- Collect and analyze data to create graphs showing the relative amounts and percentages of salt water versus fresh water.
- Understand how little fresh water is available for human use and why it is a valuable resource.

#### 2. Conservation of Matter

- Investigate physical and chemical changes in matter.
- Measure and graph the weight of substances before and after changes such as melting, dissolving, or mixing.
- Discover that even though matter may look different, the total weight remains the same.

#### 3. Interactions between Earth's Systems

- Develop models to show how Earth's systems interact in different ways.
- Examine real-world examples, such as how weather affects landforms, how living things depend on water and air, and how natural events like floods or volcanic eruptions impact ecosystems.

**Vocabulary and Key Terms:** salt water, fresh water. Ocean, glacier, ice cap, groundwater, lake, river, reservoir, aquifer, water cycle, precipitation, evaporation, condensation, runoff, collection, distribution, percentage, data, graph, resource, conservation, matter, mass, weight, physical change, chemical change, melting, freezing, evaporation, condensation, dissolving, mixing, conservation, law of conservation of matter, measurement, substance, properties, state of matter, reversible change, irreversible change, Earth's

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systems, geosphere, hydrosphere, atmosphere, biosphere, interaction, erosion, deposition, weathering, landform, ecosystem, natural event, volcanic eruption, earthquake, flood, drought, climate, weather, model, cause and effect, impact

#### Interdisciplinary Connection:

- ELA

### Daily Learning Objectives with TWPS

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

- Describe where water is found on Earth (oceans, glaciers, rivers, etc).
  - *Where do you believe most of the water on Earth is found? Explain your answer.*
- Explain the difference between salt water and fresh water.
  - *How does the difference between salt water and fresh water affect how humans and animals use it?*
- Identify major freshwater reservoirs like glaciers, lakes, and groundwater.
  - *Why might glaciers and groundwater be harder to access for freshwater use than lakes and rivers?*
- Use data to calculate the percentage of water in each Earth reservoir.
  - *What does the percentage of freshwater compared to salt water tell us about the importance of protecting water sources?*
- Represent water distribution data using bar graphs.
  - *How do graphs help us better understand how Earth's water is distributed?*
- Represent water distribution data using pie charts.
  - *What are the strengths and weaknesses of using a pie chart versus a bar graph to show water distribution?*
- Explain why only a small portion of Earth's water is usable by humans.
  - *How would life on Earth be different if the amount of freshwater available increased or decreased?*
- Compare water availability across different reservoirs.
  - *Which water reservoirs do you think are most important for human survival and why?*
- Analyze graphs to draw conclusions about water distribution on Earth.
  - *How can we use water distribution data to make decisions about conservation and water use?*
- Explain why conserving freshwater is important based on Earth's water distribution.
  - *What actions can we take as a community to protect our limited freshwater resources?*
- Describe how matter can change when it is heated, cooled, or mixed.
  - *What are some signs that a change in matter is physical instead of chemical?*
- Identify examples of physical changes in matter.
  - *How can heating or cooling affect how matter looks or feels without changing what it is?*
- Identify examples of chemical changes in matter.
  - *Why is it important to recognize whether a chemical change has occurred?*
- Measure the mass of substances before and after a chemical change.
  - *What tools and methods can we use to make sure our mass measurements are accurate?*
- Graph the mass of substance before and after changes to identify patterns.

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- *Why does the total mass stay the same even when a substance changes form?*
  - Explain that matter is conserved during changes in state (like melting or freezing).
    - *How do graphs help us prove that matter is conserved during experiments?*
  - Explain that the total weight of matter stays the same after a change.
    - *What evidence do we have that matter is not destroyed when ice melts or water boils?*
  - Use evidence from data to support that matter is not lost or gained.
    - *Why is it important for scientists to know that the weight of matter stays the same after a reaction?*
  - Investigate the Law of Conservation using real-world examples.
    - *In your own words, how would you describe the Law of Conservation to someone who does not know it?*
  - Define and give examples of the geosphere.
    - *How do features like mountains, valleys, and deserts help us understand what the geosphere is?*
  - Define and give examples of the biosphere.
    - *Why is it important for living things to interact with non-living systems like soil and water?*
  - Define and give examples of the hydrosphere.
    - *How do you think the water in rivers and oceans connects to other Earth systems?*
  - Define and give examples of the atmosphere.
    - *In what ways does the atmosphere affect daily life on Earth?*
  - Describe how the geosphere and hydrosphere interact.
    - *What might happen to a river over time if the land around it changes dramatically?*
  - Describe how the atmosphere and biosphere interact.
    - *How do changes in the air affect plants and animals?*
  - Describe how the geosphere and biosphere interact.
    - *What would happen to plants if the soil in an area became dry or eroded?*
  - Describe how the atmosphere and hydrosphere interact.
    - *How do weather patterns like storms show us interactions between air and water?*
  - Analyze real-world events to identify how Earth's systems affect each other.
    - *What Earth systems are involved when a volcano erupts, and how do they affect one another?*
  - Observe and record examples of Earth's systems interacting in nature.
    - *What patterns do you notice when observing how Earth's systems work together in nature?*
  - Build a model to show how Earth's systems interact clearly.
    - *How can you use a diagram or drawing to explain what's happening in a natural event like a thunderstorm?*
  - Explain how natural disasters involve interactions between multiple Earth systems.
    - *What evidence shows that natural disasters impact more than one Earth's system at a time?*
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#### **Instructional Strategies/Differentiated Instruction**

- Whole group instruction
- Paragraph frames and sentence starters
- Teacher modeling
- Think-write-pair-share and small-group discussions
- Graphic organizers
- Accountable talk
- Homework
- Word walls with visuals (Venn Diagrams)
- Small group instruction
- Visual exemplars with teacher and student critiques
- Text and video chunking
- Spiraling back to guiding questions
- Close reading with text-dependent questions

#### **EL Differentiation Strategies**

- Key vocabulary, Word Banks and Word Walls with visuals
- TWPS (Think, write, pair, share)
- Pre-reading strategies
- Culturally responsive teaching
- Explicit teacher modeling
- Graphic organizers
- Strategic Grouping
- Non-verbal assessments

#### **Assessments**

##### **FORMATIVE ASSESSMENTS:**

- Do Now
- Academic Discourse
- Exit Slips
- Accountable Talk Discussions
- Completed notes
- Completed graphic organizers
- Homework
- Performance Task – “Earth’s Balance”
  - Teacher’s rubric/scoring guide

##### **SUMMATIVE ASSESSMENTS:**

- Quiz: Water Distribution, Conservations of Water, Earth’s Systems (EU1, EU2, EU3, and EU4)
- Unit Task: “Earth’s Balance” (EU1, EU2 and EU3)

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#### Unit Task

**Unit Task Name:** Earth's Balance

**Description:** Upon completing the unit, students will work individually as if they are writing a nonfiction article for a kids' science magazine called "**Planet in Balance.**" The magazine issue will teach readers about the connections between water, matter, and Earth's systems. Each student's article will help others understand how our planet works and why it's important to care for it. Students will write an informational article (3–5 paragraphs) that explains how Earth's water is distributed, how matter is conserved during changes, and how Earth's systems interact. Students will also create one graph or diagram to support your writing and include a short reflection paragraph at the end.

**Evaluation:** Teacher's Scoring Guide

#### Unit Resources

- NewsEla
- Google Slides (Teacher's)
- Student Journals
- Chromebooks
- ReadWorks
- Virtual Fieldtrips
- Google Classroom
- Mystery Science