

# Lessons at a Glance

## Science Content: Big Ideas

The Watery Earth Unit concentrates on the following Big Ideas. Along with the scientific Habits of Mind discussed on pages 6–7, these concepts are reinforced throughout the unit. The lessons in which each Big Idea is introduced or is a major focus are indicated in parentheses.

### *Lessons*

- Water is a natural resource that is essential for humans and other organisms. (Lessons 1 and 2)
- Water can be on Earth’s surface, underground, or in the air. All water on Earth circulates through the water cycle. (Lessons 3–8)
- Water is a natural resource that is essential for humans and other organisms. To use it, we must develop ways to access it and clean it. (Lesson 9)
- Water is a natural resource that is essential for humans and other organisms. Sometimes humans use more water than they need. (Lesson 10)
- Water resources are limited. It is important to protect and conserve water. (Lessons 11–15)

### *Skill Building Activities*

- Paying attention to a book’s organization can assist reading comprehension. (Skill Building Activity: Reading Science Books)
- Scientists use models to represent things that are too big, small, fast, slow, far away, or dangerous to observe in the real world. (Skill Building Activity: Using Models in Science)
- Matter can change between states. Even if matter is not visible, it still exists. (Skill Building Activity: Evaporation—Changing from Liquid to Gas)
- Matter can change between states. Temperature affects the change of matter from one state to another. Even if matter is not visible, it still exists. (Skill Building Activity: Condensation—Changing from Gas to Liquid)

## Lesson Overviews

The following overviews briefly summarize each lesson in the Watery Earth Unit. Suggestions for scheduling and flexible implementation are shown in gray. Asterisks with the lesson title indicate a core lesson.

### ***Lesson 0: Doing Science***

Students sharpen their awareness of scientific thinking and become familiar with the “I Wonder” circle as they conduct a self-directed exploration and then reflect on the processes they engaged in. In the context of these experiences, they are introduced to the work of scientists and to the Science Companion “I Wonder” circle, which provides a visual representation of many of the facets of scientific inquiry, exploration, and discovery.

You can find Lesson 0 in the *Teacher Reference Materials*.

### ***Lesson 1: The Wonder of Water\****

Students engage in experiences that encourage them to appreciate water, look at it with “fresh” eyes (and other senses), and think about its importance and value in their lives.

Consider conducting the introductory discussion during language arts or writing time.

Consider teaching the Skill Building Activity “Reading Science Books” on pages 266–275 after this lesson.

### ***Lesson 2: Exploring Who Uses Water\****

In Session 1, students discuss all the ways they used water during a prior 24-hour period. They learn a simple definition of the term “natural resource” and then discuss why we consider water a natural resource. In Session 2, students read about the ways that animals and plants need and use water. Then they speculate about the water use of a bear cub, a duckling, and a fry (a young fish). Finally, they compare the ways humans and the three other organisms use water, and see some of the ways that water is necessary for living things.

This lesson is conducted over two sessions.

### ***Lesson 3: Following a Drop of Rain\****

Students begin a multi-lesson exploration of the water cycle by considering what happens to a drop of rain after it falls. They test and refine their ideas by simulating rain on different surfaces.

This lesson is conducted over two sessions.

### ***Lesson 4: Learning About Surface Water\****

Examining and discussing views of Earth from space in Session 1, students see that most of Earth's surface is water. They build on their understanding of water by locating Earth's surface water on maps, and then assess the location and types of surface water they find. In Session 2, students see a model that represents the amount of surface water on the planet, and will eventually represent all the water on Earth.

This lesson is conducted over two sessions. Consider teaching Session 1 during a social studies session.

Consider teaching the Skill Building Activity "Using Models in Science" on pages 276–283 prior to this lesson.

### ***Lesson 5: Learning About Groundwater\****

Students create a model that helps them understand how water percolates through the earth's layers and is stored underground. The class adds the water that represents the fresh water in groundwater to the Earth's Water model begun in Lesson 4.

This lesson is conducted over two sessions.

### ***Lesson 6: Learning About Frozen Water\****

To become familiar with the diversity of frozen water on Earth, students examine and discuss photographs of glaciers, pack ice, and polar ice. The class adds the water that represents the fresh water in glaciers and polar ice to the Earth's Water model begun in Lesson 4.

Consider teaching the selection from the student reference book during Language Arts or reading. You might also conduct the reflective discussion during an optional second session.

### ***Lesson 7: Learning About Water in the Air\****

Students consider the roles of evaporation and condensation in the water cycle. They learn about the tiny part of Earth's water that exists in clouds or as water vapor in the air, and they complete and discuss the Earth's Water model they began in previous lessons. In addition, they revisit the journey of the drop of rain from Lesson 3 and look ahead to Lesson 8, in which they synthesize their learning from Lessons 3–7 and investigate how all of Earth's water circulates through the water cycle.

If your class needs more experience with evaporation or condensation (or both), teach the Skill Building Activities "Evaporation—Changing from Liquid to Gas" and "Condensation—Changing from Gas to Liquid" on pages 284–307 in place of the corresponding review activities in the lesson exploration. If you choose this option, plan to spend several sessions on this lesson.

### ***Lesson 8: Modeling the Water Cycle\****

Students reflect on what they learned in the “Water Follows a Cycle” cluster about Earth’s water cycle. They begin this two session lesson by creating a mental image of the water cycle. Students then remodel their groundwater models so they can make observations of water moving through the water cycle in Session 2. Finally, students discuss their discoveries and solidify their understanding that water is a limited natural resource.

Teach this lesson in two sessions over at least four days.

### ***Lesson 9: Water In, Water Out\****

In Session 1, students discuss the homework relating to their household water systems. They also record questions they have about their community’s water supply system and wastewater system. In Sessions 2 and 3, students study their water supply and wastewater systems by going on field trips, by questioning classroom visitors, or by doing in-class research. In Session 4, they reflect on what they’ve learned about these systems.

This lesson is conducted over four sessions.

### ***Lesson 10: Considering Water Wants and Needs\****

Students revisit their water use lists from Lesson 2. They think about how much water each use requires and categorize their water use into “needs” and “wants.” Through these activities, students begin to compare how much water they use with how much water they actually need. This lesson prepares students for thinking about water conservation later in the unit.

This lesson is conducted over two sessions. Consider teaching this lesson during a social studies session. The optional journal writing prompt suggested in the second session could be used during a language arts session.

### ***Lesson 11: Conserving Water at Home\****

Students examine how water resources are used in the home. In Session 1, students analyze their tooth-brushing data and consider how their brushing behavior affects water use. In Session 2, they analyze how much water their families use at home, and recommend ways to conserve water. In Session 3, students compute data about two fictional homes to determine which family uses less water. Through these activities, students learn that personal behavior and individual choices impact the amount of water they use.

This lesson is conducted over three sessions. Sessions 2 and 3 can be taught during mathematics.

### ***Lesson 12: Walk the Talk—Looking for Pollution\****

Students discuss what they think water pollution is. They take a “Pollution Walk” on the school grounds to search for and record evidence of pollution. They explore ways this pollution might affect the water supply, and then discuss how they could reduce pollution around the school.

### ***Lesson 13: Investigating a Way to Clean Water\****

Students explore using water filters to clean water they pollute with different substances. They learn about filters, consider other ways to treat water, and debate the definition of “clean” water.

This lesson is conducted over two sessions.

### ***Lesson 14: Water Resources Case Studies\****

Students apply their learning from previous lessons as they read and discuss real-life case studies related to water conservation and water pollution. While discussing and comparing the case studies, they consider the implications of water use, misuse, and overuse; the impact of technology on water problems; and ways to address water conservation and pollution issues.

Consider teaching all or part of this lesson during a language arts or a social studies session.

### ***Lesson 15: Protecting Water Resources Project***

Students choose an issue pertaining to protecting water resources. They investigate the issue, decide how they can make an impact, and then take positive action. In up to six optional sessions, students plan their projects and produce a final product.

This lesson is comprised of multiple, optional sessions. Review the entire lesson and decide which sessions you will teach. Use language arts and social studies time to teach the sessions.

### ***Skill Building Activity: Reading Science Books***

Students familiarize themselves with the organization and layout of the Watery Earth Student Reference Book. They are encouraged to look through each section before they begin reading so they can use visual and text cues—such as headings, margin notes, and illustrations—to help understand the material and its relationship to what they already know. Ongoing reading strategies to help students absorb new information and vocabulary are included at the end of the lesson.

### ***Skill Building Activity: Using Models in Science***

Students study various types of models and consider how they are used in science. They also make models of their own.

### ***Skill Building Activity: Evaporation—Changing from Liquid to Gas***

Students investigate how water can become an invisible gas called water vapor. They observe and measure water as it evaporates in the classroom, and begin to think about variables that affect evaporation.

### ***Skill Building Activity: Condensation—Changing from Gas to Liquid***

Students review the process of evaporation, and compare examples of evaporation and condensation. They conduct explorations focused on water condensing out of the air. Students observe that water droplets form on the outside of a chilled container, and investigate where the water came from. They also observe condensation on chilled marbles, which clearly have no water inside them. By the end of the lesson, students can brainstorm additional examples of when water condenses.