



EXPEDITIONARY
LEARNING

Grade 7: Module 4B: Unit 1: Lesson 1

Introducing Module 4B: “Water Is Life”



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Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)

I can cite several pieces of text-based evidence to support an analysis of informational text. (RI.7.1)

I can determine a theme or the central ideas of informational text. (RI.7.2)

I can analyze the main ideas and supporting details presented in different media and formats. (SL.7.2)

Supporting Learning Targets

- I can analyze photos, videos, and quotes to find a main idea.
- I can determine central ideas in the reading “Water Is Life.”

Ongoing Assessment

- Notices and Wonders note-catcher
- Thinking Log



Agenda	Teaching Notes
<ol style="list-style-type: none"> 1. Opening <ol style="list-style-type: none"> A. Entry Task: How Do We Use Water? (8 minutes) B. Reviewing Learning Targets (2 minutes) 2. Work Time <ol style="list-style-type: none"> A. Gallery Work (10 minutes) B. Initial Reading of “Water Is Life” (15 minutes) 3. Closing and Assessment <ol style="list-style-type: none"> A. Introduction to Reader’s Notes for Paragraphs 1-5 of “Water Is Life” (5 minutes) B. Introducing Thinking Log (5 minutes) 4. Homework <ol style="list-style-type: none"> A. Reread Paragraphs 1-5 and complete the Reader’s Notes for Paragraphs 1-5. 	<ul style="list-style-type: none"> • This lesson introduces students to Module 4: “Water Is Life.” Students consider questions about water use and then participate in a modified Gallery Walk to preview and connect the learning that will follow in future lessons. • The Gallery Walk protocol has been modified, since its purpose here is to pique interest and curiosity, not to share text-based information. Students carefully and silently study the display of video and images, and then record observations and questions to help build background knowledge, foster community, and spark curiosity. Building background knowledge in this way promotes equity, since it “levels the playing field” for students: No matter what level of knowledge students have about the topic when they walk in, all get to learn before sharing with peers. • The success of this lesson depends on building suspense and piquing the students’ interest. Therefore, do not give away too much information about the module, its texts, or its themes until the class has completed the Gallery Walk. • Students will revisit the Gallery Walk in Lesson 9, as they think back on what they have learned in Unit 1 and what questions they still have that will inform their research in Unit 2. In Lesson 9, students will again use their Notices and Wonders note-catcher from this lesson; be sure they have a place to keep the completed chart until then, or consider keeping the note-catchers for the class and returning them during Lesson 9. • This lesson ends with a read-aloud of one of the central texts of this module, “Water Is Life” by Barbara Kingsolver. This text is complex and rich with imagery and metaphors. The purpose of the first read-aloud is for students to get the gist of the article and to start thinking more deeply about the central themes of the text, sustainability and water management. Students then reread Paragraphs 1–5 for homework, which will allow you to monitor their initial comprehension of that section of the text. • A teacher guide will accompany each Reader’s Notes in this unit. Look for it in the supporting materials immediately following the Reader’s Notes. • Students will continue to work with this text throughout many lessons in Unit 1 and again in Unit 2. • In class, students informally hear vocabulary words during the read-aloud. As a part of their homework (Reader’s Notes), they focus on specific words from Paragraphs 1–5. In future lessons, students will use a variety of strategies, both in class and as homework, to process new vocabulary, including a Domain-Specific Vocabulary anchor chart, which is introduced in Lesson 2.



Agenda	Teaching Notes (continued)
	<ul style="list-style-type: none">• During read-alouds, read slowly, fluently, and without interruption or explanation while students look at the text and actively read. This promotes fluency and comprehension for students, since they are hearing and reading the text as a whole.• This lesson focuses on SL.7.2 and RI.7.2 and gives students an opportunity to interact with different media and text to find main ideas, central ideas, and details. SL.7.2 is a new standard and will be emphasized throughout Unit 1. Students will become familiar with the Main Ideas and Details note-catcher, which they will use when watching and listening to sources, by using the same structure to track the gist of “Water Is Life” in their Reader’s Notes.• This lesson also introduces the Thinking Log, which is used throughout Units 1 and 2 as a way for students to track and reflect on their understanding of the issues of water sustainability and water management. This Thinking Log helps students track their learning and serves as a scaffold to SL.7.2—how new information has helped them clarify the issues.• In advance: Prepare the Gallery Walk items for display around the room (on chart paper or taped to the wall). Some items are images, and some are quotes.• When you set up for the Gallery Walk, post or place the items around the room in a way that will allow students to move freely and comfortably from one to the next.• Item 1 is a short video, which students can watch on a computer in the classroom. Cue up the Web page before class starts so that students can click “play” as they get to the station. Choose whether students will use headphones or listen at the station in small groups, quietly so that it will not disrupt others.• Please bear in mind that Youtube, social media video sites, and other website links may incorporate inappropriate content via comment banks and ads. While some lessons include these links as the most efficient means to view content in preparation for the lesson, be sure to preview links, and/or use a filter service, such as www.safeshare.tv, for actually viewing these links in the classroom.• Review the Gallery Walk protocol (see Appendix)• Post: Learning targets.



Lesson Vocabulary	Materials
<p>main idea, detail, analyze; aqueous, primordial (Paragraph 1), thrall, runnel, aquifer, irrigate, briny, saline (Paragraph 2), levees, grave (Paragraph 3), arid, evaporation, blighted, sodden, purchase (Paragraph 4), gale (Paragraph 5)</p>	<ul style="list-style-type: none">• Entry Task: How Do We Use Water? (one per student)• Entry Task: How Do We Use Water? (answers, for teacher reference)• Notices and Wonders note-catcher (one per student)• Suggested Gallery Walk items (for teacher reference; print and post these in advance)• “Water Is Life” by Barbara Kingsolver (one per student)• Reader’s Notes “Water Is Life” Paragraphs 1–5 (one per student and one to display)• Reader’s Notes “Water Is Life” Paragraphs 1–5, Teacher Guide (for teacher reference)• Document camera• Thinking Log (one per student)



Opening	Meeting Students' Needs
<p>A. Entry Task: How Do We Use Water? (8 minutes)</p> <ul style="list-style-type: none"> • Distribute the Entry Task: How Do We Use Water? Allow students to answer the questions individually as best they can. • Read each question and call on students to give their thoughts on the answers. Give them the answer or confirm their correct answers; refer to Entry Task: How Do We Use Water? (answers, for teacher reference). 	<ul style="list-style-type: none"> • Checking in with learning targets helps students self-assess their learning. This research-based strategy supports struggling learners most. • Allowing students to discuss with a partner before writing or sharing with the whole class is a low-stress strategy to help students process in a risk-free situation.
<p>B. Reviewing Learning Targets (2 minutes)</p> <ul style="list-style-type: none"> • Ask a student to read the learning targets aloud. • Ask students to turn and talk to a partner: <ul style="list-style-type: none"> * “Based on the entry task, what do you think might be a main idea of the module?” • Tell students that today they will participate in a Gallery Walk, during which they will listen to and examine diverse media (images, quotes, video) to better understand what this module will be about. 	



Work Time	Meeting Students' Needs
<p>A. Gallery Walk (10 minutes)</p> <ul style="list-style-type: none"> • Distribute the Notices and Wonders note-catcher. Explain that during the Gallery Walk, students should write anything they observe or that is new or interesting in the Notices column. They also may find some of the information surprising or may have questions that are not answered in the image or quote. They can write these questions in the Wonders column. Tell them that they also should try to figure out what they will learn about in this new module. • Review the Gallery Walk protocol with students as needed. Remind students of the norms for moving calmly around the room and moving to those images, quotes, and video where there are fewer classmates. Form small groups of students. • Give directions: Students will silently wander to each image, quote, or the video and write down what they notice and what they wonder for about 8 minutes. They may linger at any item and not worry if they get to all of them. Invite students to play the video, which should be already on the class computer screen. Tell them the video runs about 2 minutes, but they do not have to stay for the whole 2 minutes. • Ask each small group to bring their Notices and Wonders note-catchers and a pen or pencil and stand by one of the Gallery Walk items. • Invite students to begin the Gallery Walk. Circulate to listen in and clarify procedures as needed. If all groups are working smoothly, consider participating in this step and writing your own Notices and Wonders. • After 8 minutes, invite students to sit and finish writing their thoughts. Focus them in particular on the space at the bottom of the handout, where they can add to their initial thinking. • Refocus students whole group. Starting with Notices, allow students to “popcorn” discuss any of the ideas they have written down. • Repeat with Wonders, inviting students to discuss the questions that they have after the Gallery Walk. • Ask students to think silently about this question: <ul style="list-style-type: none"> * “What might the module be about?” • Have them turn and talk to their partner and share their idea. • Next, cold call students to share initial ideas and thoughts on what the module will be about. • Give students specific positive feedback for ways you saw them working well during the Gallery Walk or the discussion. Congratulate them for being willing to ask questions and think about information presented in diverse media; point out that this is something they will do a lot in this module. 	



Work Time (continued)	Meeting Students' Needs
<ul style="list-style-type: none">• Collect students' Notices and Wonders note-catcher (see Teaching Note; students will need these note-catchers again in Lesson 9).	
<p>B. Initial Reading of “Water Is Life” (15 minutes)</p> <ul style="list-style-type: none">• Distribute the article “Water Is Life.” Tell students this is an important article that they will spend a lot of time with in this unit. Today, they will hear it read aloud as they read along in their heads. Set a clear purpose: Tell them that their task is to think about ideas in the article that seem important.• Read aloud all 14 paragraphs of “Water Is Life” as students follow along in their heads.• After finishing, have students think and then talk with a partner:<ul style="list-style-type: none">* “Based on just this initial read, what are two important ideas from the article?”• Reiterate that they will work with this article across several lessons, and their thinking certainly will deepen and change as they understand the text more fully.	



Closing and Assessment	Meeting Students’ Needs
<p>A. Introduction to Reader’s Notes for Paragraphs 1–5 of “Water Is Life” (5 minutes)</p> <ul style="list-style-type: none"> • Tell students that while reading “Water Is Life,” they will use Reader’s Notes for homework to write down the main ideas and details in a section of text. • Distribute Reader’s Notes “Water Is Life” Paragraphs 1–5 and display a copy on a document camera. Remind students that they have kept similar Reader’s Notes in other modules. Review the structure and purpose of the Reader’s Notes. They first will read the paragraphs listed and then write down the main idea of what they read and any supporting details. • Ask students to think and discuss with a partner: <ul style="list-style-type: none"> * “What is a main idea, and what is a supporting detail?” • Cold call students to explain their thinking. Listen for them to define <i>main idea</i> as “what the paragraph is mostly about” or “the most important part,” and <i>supporting details</i> as “the smaller ideas that describe the main idea,” “reasons to support the main idea,” and “facts or other information that relate to the main idea and make it stronger.” • Point out that there will always be about five vocabulary words that are part of the reading. Sometimes the definitions will be given, but most of the time they will be words students will need to figure out based on context clues. Remind them that they will share their homework the next day in class. 	
<p>B. Introducing Thinking Log (5 minutes)</p> <ul style="list-style-type: none"> • Distribute the Thinking Log. Tell students that this log will contain questions that will be completed each day throughout the unit. The purpose of the log is to help them reflect on and clarify their thinking on the issue of water management based on their learning each day. • Read aloud the two questions for Lesson 1 and ask students to answer based on their current thinking. Ask them to put their logs in a place where they can retrieve them easily each day. 	
Homework	Meeting Students’ Needs
<ul style="list-style-type: none"> • Reread Paragraphs 1–5 of “Water Is Life” and complete the Reader’s Notes. <p><i>Note: In Lesson 2, you will use the “definition of sustainability” Gallery Walk items. All other Gallery Walk items can be taken down and stored until Lesson 9.</i></p>	



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Grade 7: Module 4B: Unit 1: Lesson 1

Supporting Materials



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Entry Task:
How Do We Use Water?

.....
Name:

.....
Date:

- 1) How much water does the average person use per day?
- a. 10–20 gallons
 - b. 40–50 gallons
 - c. 80–100 gallons
 - d. 120–140 gallons
- 2) Circle the approximate amount of water used for each activity (in gallons):
- | | | | | | |
|-----------------------------|-----|------|-------|-------|-----|
| a. taking a bath | 1–5 | 5–10 | 10–20 | 20–30 | >30 |
| b. taking a 5-minute shower | 1–5 | 5–10 | 10–20 | 20–30 | >30 |
| c. brushing your teeth | 1–5 | 5–10 | 10–20 | 20–30 | >30 |
| d. flushing the toilet | 1–5 | 5–10 | 10–20 | 20–30 | >30 |
- 3) How much more does bottled water cost than tap water in the United States?
- a. 100 times more
 - b. 1,000 times more
 - c. 10,000 times more
 - d. 100,000 times more
- 4) How much did a *Tyrannosaurus rex* pee?
- a. 10–20 gallons
 - b. 40–50 gallons
 - c. 80–100 gallons
 - d. 120–140 gallons

Entry Task:

How Do We Use Water? (Answers for Teacher Reference)

Name: _____

Date: _____

- 1) How much water does the average person use per day?
- a. 10–20 gallons
 - b. 40–50 gallons
 - c. 80–100 gallons**
 - d. 120–140 gallons

The correct answer is c) 80–100 gallons per day, although estimates vary. This includes bathing, showering, teeth brushing, hand/face washing, shaving, dishwashing, washing clothes, toilet flushing, drinking, and outdoor watering.

Source: <http://ga.water.usgs.gov/edu/qa-home-percapita.html>

- 2) Circle the approximate amount of water used for each activity (in gallons):
- | | | | | | |
|-----------------------------|------------|------|-------|--------------|-----|
| a. taking a bath | 1–5 | 5–10 | 10–20 | 20–30 | >30 |
| b. taking a 5-minute shower | 1–5 | 5–10 | 10–20 | 20–30 | >30 |
| c. brushing your teeth | 1–5 | 5–10 | 10–20 | 20–30 | >30 |
| d. flushing the toilet | 1–5 | 5–10 | 10–20 | 20–30 | >30 |

- 3) How much more does bottled water cost than tap water in the United States?
- a. 100 times more
 - b. 1,000 times more
 - c. 10,000 times more**
 - d. 100,000 times more

Source: <http://www.midwestmultisportlife.com/2012/08/bottled-water-vs-tap-water.html>

- 4) How much did a *Tyrannosaurus rex* pee?
- a. 10–20 gallons
 - b. 40–50 gallons**
 - c. 80–100 gallons
 - d. 120–140 gallons

Notices and Wonders

Notices	Wonders

Notices and Wonders

My initial thoughts:

1. What do you think are some of the ideas that we will explore in this module?

2. Which quiz question or Gallery Walk item made you most curious to learn more? Why?

Suggested Gallery Walk Items
(For Teacher Reference)

Items 1–13 are essential. Items 14–26 are included as optional pieces, depending on space and class size.

Item 1

CNN video on N.Y. bottled water ban 2009 (2:21)

<http://www.riverkeeper.org/campaigns/tapwater/>

Item 2

EPA definition of sustainability (see Lesson 2)

<http://www.epa.gov/sustainability/basicinfo.htm>

Item 3

Image of stone-washed blue jeans

http://www.nytimes.com/2011/11/02/science/earth/levi-strauss-tries-to-minimize-water-use.html?pagewanted=all&_r=0

Item 4

Image “Of the World’s...”

<http://www.pwf.co.im/watershortage.htm>

Item 5

Image of woman carrying water

<http://ibnlive.in.com/news/ap-water-shortage-hits-tirumala-again/272254-62-127.html>

Item 6

And we only have that one allotment of water—it was delivered here 4.4 billion years ago. No water is being created or destroyed on Earth. So every drop of water that’s here has seen the inside of a cloud, and the inside of a volcano, the inside of a maple leaf, and the inside of a dinosaur kidney, probably many times (Fishman, 17).

Item 7

Infographic on agriculture use of water

<http://inhabitat.com/seametrics-infographic-sheds-light-on-how-much-water-is-used-in-farming/infographic-farm-water/>

Suggested Gallery Walk Items
(For Teacher Reference)

Item 8

Image of New York State watersheds

<http://www.dec.ny.gov/lands/26561.html>

Item 9

How much water did a *Tyrannosaurus rex* drink each day? It may not be known for sure, but scientists have found a spot where a dinosaur paused one day in the Mesozoic era to pee on a sandy patch of ground. The resulting trench, from just a single squat, is at least the size of a modern bathtub, 40 to 50 gallons (Fishman, 17).

Item 10

So at least 40 percent of the world either doesn't have good access to water, or has to walk to get it. Forty percent—look to your left and your right, that's four out of ten people (Fishman, 13).

Item 11

Even while we take Mother Water for granted, humans understand in our bones that she is the boss. We stake our civilizations on the coasts and mighty rivers. Our deepest dread is the threat of having too little moisture—or too much (Paragraph 3, “Water Is Life” by Barbara Kingsolver).

Item 12

It is an ancient, dazzling relic, temporarily quarantined here in my glass, waiting to return to its kind, waiting to move a mountain. It is the gold standard of biological currency, and the good news is that we can conserve it in countless ways (“Water Is Life” by Barbara Kingsolver).

Item 13

Cascading Consequences chart

Use sample anchor chart from Unit 2.

Optional items depending on space and class size:

Item 14

Image of mudflats (Note: Consider putting a caption under this image, “MUDFLAT,” as this will be a vocabulary word later in the module.

<http://www.treehugger.com/corporate-responsibility/120-nations-meet-in-attempt-to-avert-global-water-crisis.html>

Suggested Gallery Walk Items
(For Teacher Reference)

Item 15

Infographic on global distribution of the world's water

<http://threenineyeight.com/2010/04/29/water-infographics/>

Item 16

Infographic on the water-rich and water-poor

<http://www.seametrics.com/blog/wp-content/uploads/2012/06/waterrichvswaterpoor.jpg>

Item 17

The number of children who die every year just for lack of a daily glass of clean water is equal to the number of elementary school children in Florida. It's like losing every kid in Florida between the ages of five and twelve—every year, year after year (Fishman, 13).

Item 18

Water itself isn't becoming more scarce, it's simply disappearing from places where people have become accustomed to finding it—where they have built communities assuming a certain availability of water—and reappearing somewhere else (Fishman, 19).

Item 19

Image of graphic “The Price of H₂O”

http://www.forbes.com/2008/07/14/california-supply-demand-oped-cx_dz_0715water.html

Item 20

Image of people in Delhi around a water tanker

<http://cdnworldissues.edublogs.org/files/2012/05/water-shortage-in-delhi-1tdzvn8.jpg>

Item 21

Infographic on why you should stop drinking bottled water

<http://visual.ly/why-you-should-stop-drinking-bottled-water>

Suggested Gallery Walk Items
(For Teacher Reference)

Item 22

Almost every community in the United States has water problems. The good news is, water problems can be solved, and the sooner we start thinking about them, the less expensive those solutions are. The bad news is, water problems can't be solved quickly, and when there's a water crisis, the quick solutions are expensive. Water requires thinking about the future not in sunny, optimistic terms but in frankly realistic terms (Fishman, 80-81).

Suggested Gallery Walk Items
(For Teacher Reference)

Item 23

If there is one truly arresting sign that our relationship to water is about to shift in fundamental ways ... it comes from Monsanto, the agri-conglomerate, and from Royal Caribbean, the cruise-ship company, it comes from Coca-Cola and Campbell Soup and Intel, from Levi Strauss and IBM, from GE and MGM Resorts. They all have that same tickle of anxiety—in corporate terms—about water security (Fishman, 117).

Item 24

It's a funny moment in the world of water—big companies, water-dependent companies, companies with a particular risk or a particular sensitivity are ahead of the rest of us in worrying about water.... It's good because it's a clear signal to the rest of us to start paying attention to water; it's good in the simplest terms of all: When the water crises start to break out more routinely, at least someone will be ready. But it should also make us nervous (Fishman, 141).

Item 25

Despite their utter reliability, our water systems are anything but robust. They are durable. But they are rigid, locked into their own assumptions of where the water will come from and where it will be needed (Fishman, 209).

Item 26

Beyond population and climate change, the other huge and growing pressure on water supplies is economic development.... Economic development requires rivers full of water, not just because people want more secure and more abundant water as their incomes improve but because modern factories and businesses use such huge volumes of water (Fishman, 16).

Item 27

The first is, water can be cleaned, always.... The second point is, you can't use up water (Fishman, 17-18).

Item 28

All water problems are local (Fishman, 19).

The problems are local, but the consequences, the damage, and the costs are anything but local. The distance we imagine between ourselves and other people's water problems is just another case of not seeing water, and our relationship to water, clearly (Fishman, 20).

Water is Life

By Barbara Kingsolver

Published April 2010, *National Geographic* magazine
<http://ngm.nationalgeographic.com/2010/04/water-is-life/kingsolver-text>

The amount of moisture on Earth has not changed. The water the dinosaurs drank millions of years ago is the same water that falls as rain today. But will there be enough for a more crowded world?

- 1 We keep an eye out for wonders, my daughter and I, every morning as we walk down our farm lane to meet the school bus. And wherever we find them, they reflect the magic of water: a spider web drooping with dew like a rhinestone necklace. A rain-colored heron rising from the creek bank. One astonishing morning, we had a visitation of frogs. Dozens of them hurtled up from the grass ahead of our feet, launching themselves, white-bellied, in bouncing arcs, as if we'd been caught in a downpour of amphibians. It seemed to mark the dawning of some new *aqueous* age. On another day we met a snapping turtle in his *primordial* olive drab armor. Normally this is a pond-locked creature, but some murky ambition had moved him onto our gravel lane, using the rainy week as a passport from our farm to somewhere else.
- 2 The little, nameless creek tumbling through our hollow holds us in *thrall*. Before we came to southern Appalachia, we lived for years in Arizona, where a permanent *runnel* of that size would merit a nature preserve. In the Grand Canyon State, every license plate reminded us that water changes the face of the land, splitting open rock desert like a peach, leaving mile-deep gashes of infinite hue. Cities there function like space stations, importing every ounce of fresh water from distant rivers or fossil *aquifers*. But such is the human inclination to take water as a birthright that public fountains still may bubble in Arizona's town squares and farmers there raise thirsty crops. Retirees from rainier climes *irrigate* green lawns that impersonate the grasslands they left behind. The truth encroaches on all the fantasies, though, when desert residents wait months between rains, watching cacti tighten their belts and roadrunners skirmish over precious beads from a dripping garden faucet. Water is life. It's the *briny* broth of our origins, the pounding circulatory system of the world, a precarious molecular edge on which we survive. It makes up two-thirds of our bodies, just like the map of the world; our vital fluids are *saline*, like the ocean. The apple doesn't fall far from the tree.

Water is Life

By Barbara Kingsolver

- 3 Even while we take Mother Water for granted, humans understand in our bones that she is the boss. We stake our civilizations on the coasts and mighty rivers. Our deepest dread is the threat of having too little moisture—or too much. We’ve lately raised the Earth’s average temperature by $.74^{\circ}\text{C}$ (1.3°F), a number that sounds inconsequential. But these words do not: flood, drought, hurricane, rising sea levels, bursting levees. Water is the visible face of climate and, therefore, climate change. Shifting rain patterns flood some regions and dry up others as nature demonstrates a grave physics lesson: Hot air holds more water molecules than cold.
- 4 The results are in plain sight along pummeled coasts from Louisiana to the Philippines as superwarmed air above the ocean brews superstorms, the likes of which we have never known. In arid places the same physics amplify evaporation and drought, visible in the dust-dry farms of the Murray-Darling River Basin in Australia. On top of the Himalaya, glaciers whose meltwater sustains vast populations are dwindling. The snapping turtle I met on my lane may have been looking for higher ground. Last summer brought us a string of floods that left tomatoes blighted on the vine and our farmers needing disaster relief for the third consecutive year. The past decade has brought us more extreme storms than ever before, of the kind that dump many inches in a day, laying down crops and utility poles and great sodden oaks whose roots cannot find purchase in the saturated ground. The word “disaster” seems to mock us. After enough repetitions of shocking weather, we can’t remain indefinitely shocked.
- 5 How can the world shift beneath our feet? All we know is founded on its rhythms: Water will flow from the snowcapped mountains, rain and sun will arrive in their proper seasons. Humans first formed our tongues around language, surely, for the purpose of explaining these constants to our children. What should we tell them now? That “reliable” has been rained out, or died of thirst? When the Earth seems to raise its own voice to the pitch of a gale, have we the ears to listen?

Water is Life

By Barbara Kingsolver

- 6 A world away from my damp hollow, the Bajo Piura Valley is a great bowl of the driest Holocene sands I've ever gotten in my shoes. Stretching from coastal, northwestern Peru into southern Ecuador, the 14,000-square-mile Piura Desert is home to many endemic forms of thorny life. Profiles of this eco-region describe it as dry to drier, and Bajo Piura on its southern edge is what anyone would call driest. Between January and March it might get close to an inch of rain, depending on the whims of El Nino, my driver explained as we bumped over the dry bed of the Rio Piura, "but in some years, nothing at all." For hours we passed through white-crust fields ruined by years of irrigation and then into eye-burning valleys beyond the limits of endurance for anything but sparse stands of the deep-rooted *Prosopis pallida*, arguably nature's most arid-adapted tree. And remarkably, some scattered families of *Homo sapiens*.
- 7 They are economic refugees, looking for land that costs nothing. In Bajo Piura they find it, although living there has other costs, and fragile drylands pay their own price too, as people exacerbate desertification by cutting anything living for firewood. What brought me there, as a journalist, was an innovative reforestation project. Peruvian conservationists, partnered with the NGO Heifer International, were guiding the population into herding goats, which eat the protein-rich pods of the native mesquite and disperse its seeds over the desert. In the shade of a stick shelter, a young mother set her dented pot on a dung-fed fire and showed how she curdles goat's milk into white cheese. But milking goats is hard to work into her schedule when she, and every other woman she knows, must walk about eight hours a day to collect water.
- 8 Their husbands were digging a well nearby. They worked with hand trowels, a plywood form for lining the shaft with concrete, inch by inch, and a sturdy hand-built crank for lowering a man to the bottom and sending up buckets of sand. A dozen hopeful men in stained straw hats stood back to let me inspect their work, which so far had yielded only a mountain of exhumed sand, dry as dust. I looked down that black hole, then turned and climbed the sand mound to hide my unprofessional tears. I could not fathom this kind of perseverance and wondered how long these beleaguered people would last before they'd had enough of their water woes and moved somewhere else.

Water is Life

By Barbara Kingsolver

- 9 Five years later they are still bringing up dry sand, scratching out their fate as a microcosm of life on this planet. There is nowhere else. Forty percent of the households in sub-Saharan Africa are more than a half hour from the nearest water, and that distance is growing. Australian farmers can't follow the rainfall patterns that have shifted south to fall on the sea. A salmon that runs into a dam when homing in on her natal stream cannot make other plans. Together we dig in, for all we're worth.
- 10 Since childhood I've heard it's possible to look up from the bottom of a well and see stars, even in daylight. Aristotle wrote about this, and so did Charles Dickens. On many a dark night the vision of that round slip of sky with stars has comforted me. Here's the only problem: It's not true. Western civilization was in no great hurry to give up this folklore; astronomers believed it for centuries, but a few of them eventually thought to test it and had their illusions dashed by simple observation.
- 11 Civilization has been similarly slow to give up on our myth of the Earth's infinite generosity. Declining to look for evidence to the contrary, we just knew it was there. We pumped aquifers and diverted rivers, trusting the twin lucky stars of unrestrained human expansion and endless supply. Now water tables plummet in countries harboring half the world's population. Rather grandly, we have overdrawn our accounts.
- 12 In 1968 the ecologist Garrett Hardin wrote a paper called "The Tragedy of the Commons," required reading for biology students ever since. It addresses the problems that can be solved only by "a change in human values or ideas of morality" in situations where rational pursuit of individual self-interest leads to collective ruin. Cattle farmers who share a common pasture, for example, will increase their herds one by one until they destroy the pasture by overgrazing. Agreeing to self-imposed limits instead, unthinkable at first, will become the right thing to do. While our laws imply that morality is fixed, Hardin made the point that "the morality of an act is a function of the state of the system at the time it is performed." Surely it was no sin, once upon a time, to shoot and make pies of passenger pigeons.

Water is Life

By Barbara Kingsolver

- 13 Water is the ultimate commons. Watercourses once seemed as boundless as those pigeons that darkened the sky overhead, and the notion of protecting water was as silly as bottling it. But rules change. Time and again, from New Mexico's antique irrigation codes to the UN Convention on International Watercourses, communities have studied water systems and redefined wise use. Now Ecuador has become the first nation on Earth to put the rights of nature in its constitution so that rivers and forests are not simply property but maintain their own right to flourish. Under these laws a citizen might file suit on behalf of an injured watershed, recognizing that its health is crucial to the common good. Other nations may follow Ecuador's lead. Just as legal systems once reeled to comprehend women or former slaves as fully entitled, law schools in the U.S. are now reforming their curricula with an eye to understanding and acknowledging nature's rights.
- 14 On my desk, a glass of water has caught the afternoon light, and I'm still looking for wonders. Who owns this water? How can I call it mine when its fate is to run through rivers and living bodies, so many already and so many more to come? It is an ancient, dazzling relic, temporarily quarantined here in my glass, waiting to return to its kind, waiting to move a mountain. It is the gold standard of biological currency, and the good news is that we can conserve it in countless ways. Also, unlike petroleum, water will always be with us. Our trust in Earth's infinite generosity was half right, as every raindrop will run to the ocean, and the ocean will rise into the firmament. And half wrong, because we are not important to water. It's the other way around. Our task is to work out reasonable ways to survive inside its boundaries. We'd be wise to fix our sights on some new stars. The gentle nudge of evidence, the guidance of science, and a heart for protecting the commons: These are the tools of a new century. Taking a wide-eyed look at a watery planet is our way of knowing the stakes, the better to know our place.

Barbara Kingsolver/National Geographic Stock

Reader's Notes:
"Water Is Life" Paragraphs 1-5

Name:

Date:

Directions: Use this note-catcher to get the gist of the reading. Remember that the main idea and supporting details are often not just a single sentence of the text; rather, they may involve multiple sentences.

Main idea:	
Supporting detail:	Supporting detail:
Supporting detail:	Supporting detail:
Supporting detail:	Supporting detail:

Reader's Notes:
"Water Is Life" Paragraphs 1-5

Name: _____

Date: _____

Vocabulary

Word	Definition	Context clues: How did you figure out this word?
aqueous (Paragraph 1)		
runnel (Paragraph 2)		
aquifer (Paragraph 2)	A natural well	
saline (Paragraph 2)		
arid (Paragraph 4)		
evaporation (Paragraph 4)		

Reader's Notes: "Water Is Life" Paragraphs 1-5,
Teacher's Guide (For Teacher Reference)

<p>Main idea: People need to start paying attention to how our actions impact water in our world.</p>	
<p>Supporting detail: Humans assume that water is a birthright, using it for fountains in Arizona and watering lawns that wouldn't otherwise grow there.</p>	<p>Supporting detail: Humans' activity has raised the Earth's temperature that has caused changes to weather.</p>
<p>Supporting detail: There are terrible 'superstorms' because the air above the oceans is warmer.</p>	<p>Supporting detail: Drought has gotten worse in dry places, like the Murray-Darling river basin in Australia.</p>
<p>Supporting detail: Floods happen more often, causing disasters for farmers and other people.</p>	<p>Supporting detail:</p>

Reader's Notes: "Water Is Life" Paragraphs 1-5,
Teacher's Guide (For Teacher Reference)

Vocabulary

Word	Definition	Context clues: How did you figure out this word?
aqueous (Paragraph 1)	Related to water	
runnel (Paragraph 2)	A small stream	
aquifer (Paragraph 2)	A natural well	
saline (Paragraph 2)	Salty	
arid (Paragraph 4)	Dry	
evaporation (Paragraph 4)	The process of liquid turning into gas	

Thinking Log:
Unit 1

Name:

Date:

The Thinking Log is a place for you to track and reflect on your understanding of the sustainability of water and water management. Each entry in your Thinking Log will ask you to explain your current understanding of this issue.

Lesson 1: “Water Is Life”

Based on what you know so far, why are we running out of fresh water?

What are you wondering so far about the issue of running out of fresh water?

Thinking Log:
Unit 1

Lesson 2: “Water Is Life” Paragraphs 1–5

Based on Paragraphs 1–5 of “Water Is Life,” why is water sustainability an issue?

What else are you wondering about water sustainability?

Thinking Log:
Unit 1

Lesson 3: “Water Is Life” Paragraphs 6–9

Reread what you wrote in Lesson 2. Based on what you read today, how have you expanded your understanding of water sustainability?

What else are you wondering about water sustainability?

Thinking Log:
Unit 1

Lesson 3: “Water Is Life” Paragraphs 6–9

Reread what you wrote in Lesson 2. Based on what you read today, how have you expanded your understanding of water sustainability?

What else are you wondering about water sustainability?

Thinking Log:
Unit 1

Lesson 4: “Water Is Life” Paragraphs 10–14 and “Why Care about Water?”

Reread what you wrote in Lesson 3. Based on what you read and watched today, how have you expanded your understanding of water sustainability?

What else are you wondering about water sustainability?

Thinking Log:
Unit 1

Lesson 6: *The Big Thirst* Pages 1–5

Reread what you wrote in Lesson 4. Based on what you read today, how have you expanded your understanding of water sustainability?

What else are you wondering about water sustainability?

Thinking Log:
Unit 1

Lesson 8: *The Big Thirst* Pages 12–15 and “The Future of Water”

How did today’s video and reading help clarify your thinking about the issue of water sustainability?

What else are you wondering about water sustainability?



Thinking Log:
Unit 1

Lesson 9: *The Big Thirst* Pages 12–15 and “The Future of Water”

In class, you revisited the Gallery Walk from the beginning of the unit. How has revisiting the resources in the Gallery Walk clarified your thinking about the issue of water sustainability and water management?

What else are you wondering about water sustainability?

Lesson 1: *The Big Thirst* and “Water Is Life”

Using the analysis you have just completed in this lesson, decide which set of evidence (Fishman or Kingsolver) you think is stronger, and give one reason why.

Thinking Log:
Unit 2

Lesson 5: *The Big Thirst* Paragraphs 112–116

Based on what you read for homework, how have you expanded your understanding of water sustainability?

What else are you wondering about water sustainability?

Lesson 6: *The Big Thirst* Paragraphs 112–116

Based on what you read for homework, how have you expanded your understanding of water sustainability?

What else are you wondering about water sustainability?

Thinking Log:
Unit 2

Lesson 15: End of Unit 2 Assessment: Part 1

How did the Fishbowls clarify your thinking about better ways to manage the agriculture and industrial use of water more sustainably?
