Table of Contents

Introduction to the Reading Partners and the Strategies 6

Unit 1: Saving the World Around Us

Unit 1 Strategies 8
Learn the Strategies: John Todd's Living Machine 10
Organizing Information: Problem-Solution Frame 20
Writing for Comprehension 21
Vocabulary: Roots 22
Fluency: Readers' Theater 23
Practice the Strategies: Are We Wasting Our Wetlands? 24
Vocabulary: Analogies 34
Fluency: Speech 35
Apply the Strategies: Taking Care of Our Mother, the Earth 36
Vocabulary: Eponyms 44
Fluency: Speech 45
Reading in the Real World: Steps in a Process 46
Connecting to the Real World: Explore More 48

Unit 2: Their Thoughts Changed Our Lives

Unit 2 Strategies 50
Learn the Strategies: Mahatma Gandhi: Great Soul of India 52
Organizing Information: Character Chart 62
Writing for Comprehension 63
Vocabulary: Prefixes and Antonyms 64
Fluency: Speech 65
Practice the Strategies: Albert Einstein: Man of the Century 66
Vocabulary: Roots and Prefixes 76
Fluency: Readers' Theater 77
Apply the Strategies: Rachel Carson: Environmental Pioneer . . . 78
Vocabulary: Word Roots 88
Fluency: Readers' Theater 89
Reading in the Real World: Recipe 90
Connecting to the Real World: Explore More 92

Table of Contents (continued)

Unit 3: Unsolved Mysteries in History

Unit 3 Strategies 94
Learn the Strategies: Lost Cities of Legend 96
Organizing Information: Support Pattern 106
Writing for Comprehension 107
Vocabulary: The Root *spire* 108
Fluency: Poetry 109
Practice the Strategies: The Mysteries of Easter Island 110
Vocabulary: Affixes 120
Fluency: Readers' Theater 121
Apply the Strategies: Lost: One Colony 122
Vocabulary: Antonyms 132
Fluency: Letter 133
Reading in the Real World: Procedural Text 134
Connecting to the Real World: Explore More 136

Unit 4: Dangerous Journeys

Unit 4 Strategies 138
Learn the Strategies: Her Name Was Sacajawea 140
Organizing Information: Cause-and-Effect Chart 150
Writing for Comprehension 151
Vocabulary: American Indian Words 152
Fluency: News Report 153
Practice the Strategies: Survival on Ice: Shackleton's Story 154
Vocabulary: The Root *Viviere* 164
Fluency: Crew Diary 165
Apply the Strategies: The Incredible Voyage of the *Kon-Tiki* 166
Vocabulary: Context Clues 174
Fluency: Research Report 175
Reading in the Real World: Time Line 176
Connecting to the Real World: Explore More 178

Unit 5: Memoirs and Diaries

Unit 5 Strategies 180

Learn the Strategies: Excerpts From *Pedro's Journal* 182

Organizing Information: Sequence Chain 192

Writing for Comprehension 193

Vocabulary: Root Words 194

Fluency: Letter 195

Practice the Strategies: "The Sound of Drums and Gongs" from *Red Scarf Girl* 196

Vocabulary: Suffixes 208

Fluency: Historical Account 209

Apply the Strategies: Excerpts From *Zlata's Diary* 210

Vocabulary: Similes 222

Fluency: Readers' Theater 223

Reading in the Real World: Instructions 224

Connecting to the Real World: Explore More 226

Unit 6: Great Sports Stars, Great People

Unit 6 Strategies 228

Learn the Strategies: Roberto Clemente: Pride of Pittsburgh, Glory of Puerto Rico 230

Organizing Information: Main Idea Table 240

Writing for Comprehension 241

Vocabulary: Prefixes 242

Fluency: Readers' Theater 243

Practice the Strategies: Babe Didrikson Zaharias: Natural-Born Athlete . . 244

Vocabulary: Names of Sports 254

Fluency: Poetry 255

Apply the Strategies: Arthur Ashe—A Class Act 256

Vocabulary: Foreign Words 264

Fluency: Readers' Theater 265

Reading in the Real World: Rules 266

Connecting to the Real World: Explore More 268

Hi! We're your READ FOR REAL Reading Team Partners!

Have you noticed that the reading you do in science and social studies is different from reading stories and novels? Reading nonfiction is different. When you read nonfiction, you learn new information. We'll introduce you to some strategies that will help you read and understand nonfiction.

In each unit, you'll learn three strategies—one to use **Before** you read, one to use **During** your reading, and one to use **After** you read. You'll work with these strategies in all three reading selections in each unit.

In the first selection, you'll **Learn** the unit strategies. When you see a red button like this, read "My Thinking" notes to see how one of us modeled the strategy.

In the second selection in each unit, you'll **Practice** the strategies by jotting down your own notes about how you used the same unit strategies. The red button will tell you where to stop and think about the strategies.

When you read the last selection in each unit, you'll **Apply** the strategies. You'll decide when to stop and take notes as you read.

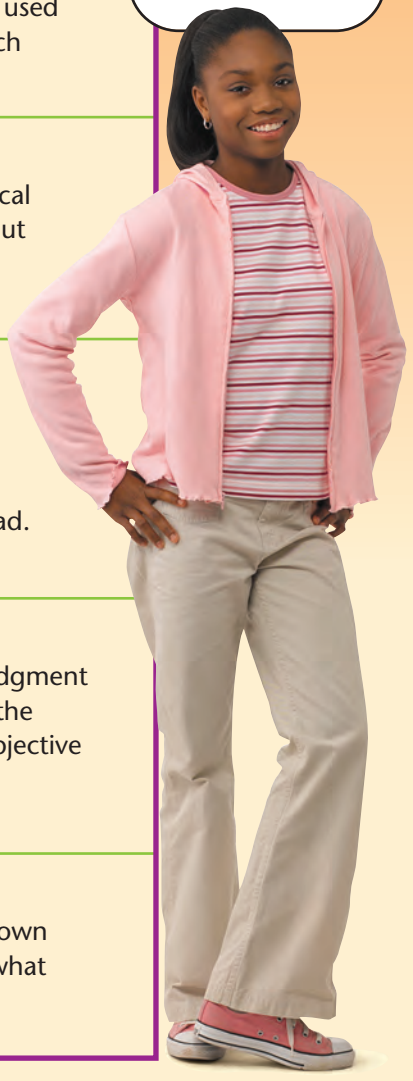
Strategies

Here they are—the **Before, During,** and **After** Reading Strategies.

Use these strategies with all your nonfiction reading—social studies and science textbooks, magazine and newspaper articles, Web sites, and more.

	BEFORE READING	DURING READING	AFTER READING
UNIT 1	**Preview the Selection** by looking at the title and headings to predict what the selection will be about.	**Make Connections** by relating information that I already know about the subject to what I'm reading.	**Recall** by summarizing the selection in writing or out loud.
UNIT 2	**Activate Prior Knowledge** by looking at the title, headings, pictures, and graphics to decide what I know about this topic.	**Interact With Text** by identifying the main idea and supporting details.	**Evaluate** by searching the selection to determine how the author used evidence to reach conclusions.
UNIT 3	**Set a Purpose** by using the title and headings to write questions that I can answer while I am reading.	**Clarify Understanding** by using photographs, charts, and other graphics to help me understand what I'm reading.	**Respond** by drawing logical conclusions about the topic.
UNIT 4	**Preview the Selection** by looking at the photographs, illustrations, captions, and graphics to predict what the selection will be about.	**Make Connections** by comparing my experiences with what I'm reading.	**Recall** by using the headings to question myself about what I read.
UNIT 5	**Activate Prior Knowledge** by reading the introduction and/or summary to decide what I know about this topic.	**Interact With Text** by identifying how the text is organized.	**Evaluate** by forming a judgment about whether the selection was objective or biased.
UNIT 6	**Set a Purpose** by skimming the selection to decide what I want to know about this subject.	**Clarify Understanding** by deciding whether the information I'm reading is fact or opinion.	**Respond** by forming my own opinion about what I've read.

Now that you've met the team, it's time to get started.



Unit 1 Strategies

BEFORE READING

Preview the Selection

by looking at the title and headings to predict what the selection will be about.

DURING READING

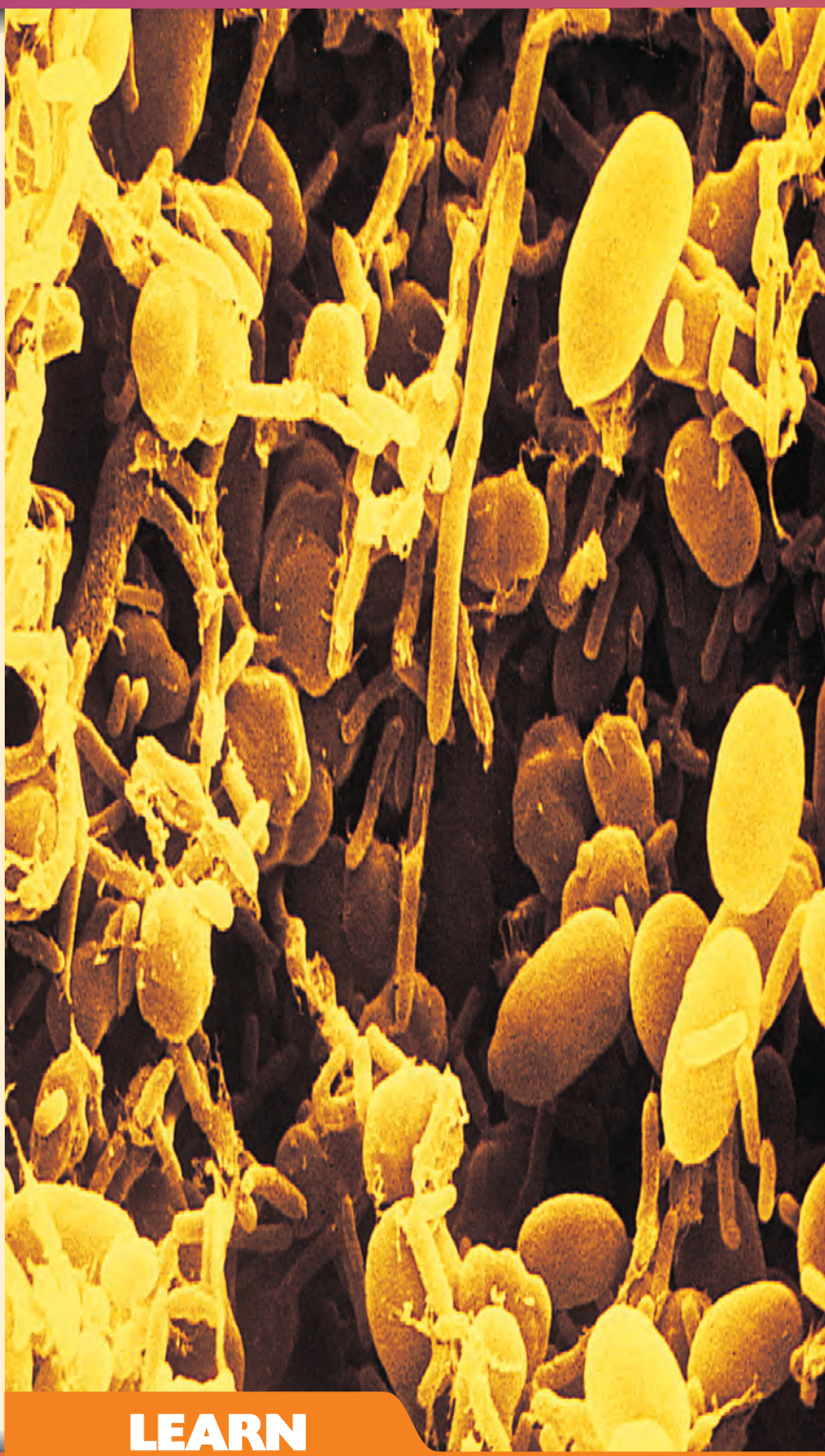
Make Connections

by relating information that I already know about the subject to what I'm reading.

AFTER READING

Recall

by summarizing the selection in writing or out loud.



LEARN
the **strategies**
in the selection
John Todd's Living Machine
page 11

Saving the World Around Us

PRACTICE
the **strategies**
in the selection
Are We Wasting Our Wetlands?
page 25

APPLY
the **strategies**
in the selection
Taking Care of Our Mother, the Earth
page 37

Think About the Strategies

BEFORE READING

Preview the Selection

by looking at the title and headings to predict what the selection will be about.

My Thinking

The strategy says to preview the selection by looking at the title and headings to predict what the selection will be about. The title says someone named John Todd has a machine that is living. The headings mention bacteria, water, and tests. I predict that this selection will be about a machine that does something to water. Now I'm ready to read and find out if my prediction is right.

DURING READING

Make Connections

by relating information that I already know about the subject to what I'm reading.

My Thinking

The strategy says to make connections by relating information that I already know about the subject to what I'm reading. I will stop and think about this strategy every time I come to a red button like this .

John Todd's Living Machine

John Todd (left) discussing his Living Machine

Picture a very large plastic tank. There are snails clinging to the tank walls, three kinds of colorful fish gliding back and forth, and healthy green plants waving in the clear water. Would you ever think that this peaceful environment could be used to clean up water **pollution**? An **oceanographer** named John Todd thought so when he developed a system to treat water. It was called the Living Machine.

Vo•cab•u•lar•y

pollution (puh•**loo**•shuhn)—waste which is harmful to living things

oceanographer (oh•shuh•**nahg**•ruh•fur)—a scientist who studies oceans

Nature's Web

Todd knew that plants and animals are all linked together in nature. The waste of one life form can be a source of food or energy for another. **Photosynthesis** is a good example of this process. Green plants use sunlight to change water and **carbon dioxide** into oxygen. Then, animals and people breathe in the oxygen. When they exhale, they breathe out carbon dioxide. Then, the cycle begins again. The food chain is another example that shows how creatures are linked. A big fish eats a small fish that ate a smaller fish. The smallest fish ate tiny creatures or plants. In nature, everything is used. Todd believed that what people saw as waste—sewage—could be used by other living things.

Strategy

Make Connections
by relating information that I already know about the subject to what I'm reading.

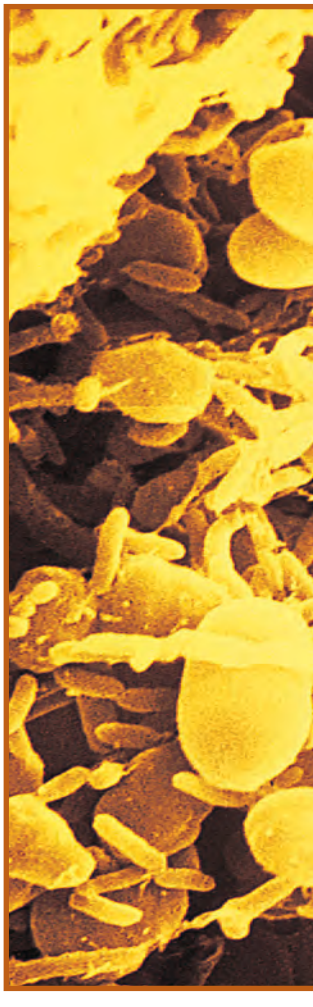
My Thinking

I know there's a water treatment plant for our town. I wonder what it does? I guess I never thought much about it.

Down the Drain

As water pours out of the faucet into your kitchen sink, it swirls around the drain and disappears. With it go bits of food from the dinner dishes. Dishwashing detergent also goes down the drain. All the water that is thrown away after it is used is called wastewater. Think about all the wastewater that flows out of the sinks, tubs, and toilets in your home. Then multiply that by all the houses, schools, stores, and hospitals in your town. A lot of dirty water is going down the drain—nearly 100 gallons for every person in the United States every day! Where does all that dirty water go?

If wastewater were left dirty, sewage would flow freely into rivers and harbors. The pollution caused by this sewage would be a terrible health hazard. It would also be terrible to look at and to smell! To keep this from happening, the sewage is purified, or cleaned. First, the wastewater goes through screens and any solid objects are removed. The second treatment relies on nature's smallest and most powerful life form—microbes. Microbes are microscopic plants and animals. They are so small that they can only be seen with a microscope. Bacteria are one kind of microbe.



Vo • cab • u • lar • y

photosynthesis (foh•toh•**sin**•thi•sis)—green plants use sunlight and water for energy

carbon dioxide (dy•**ok**•syd)—a gas breathed out by animals and used by plants

Bacteria: Good and Bad

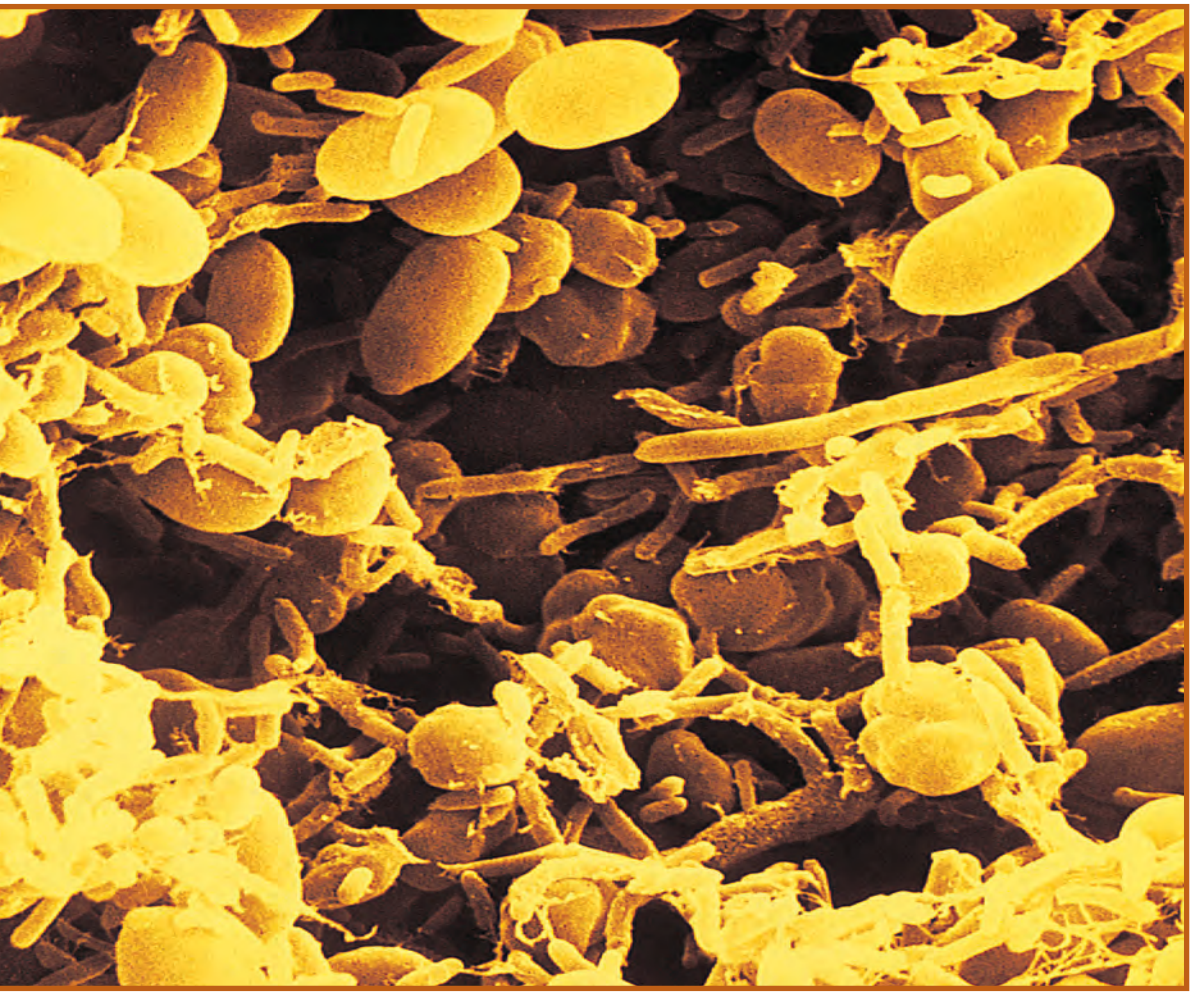
Bacteria can be both harmful and helpful. You probably know about the harmful things that bacteria can do. For example, they can give a person an earache or an infected finger. But if there were no bacteria, all the dead plants and animals that ever existed would still be here, covering Earth! Fortunately for us, bacteria use these substances as food.

For instance, in a natural environment, like a forest, bacteria also eat animal waste and help it **decompose**. They change the chemical elements in this waste into a chemical that is food for plants. The plants use this chemical to grow leaves and roots, and later, an animal eats the plant. The elements from the waste have been rearranged to build the body of the animal—and bacteria got it all started!

Strategy

Make Connections
by relating information that I already know about the subject to what I'm reading.

My Thinking
I knew bacteria could make me sick, but I didn't know it could also help me.



Decomposing bacteria magnified 12,000 times

Vo•cab•u•lar•y

decompose (dee•kuhm•**pohz**)—to rot or decay

Strategy

Make Connections by relating information that I already know about the subject to what I'm reading.

My Thinking

I know that a way to cut down on water pollution is recycling.

Living Machines

Todd thought that a link was missing from most sewage treatment systems. The new material made by the bacteria—the material plants would normally use—was not being used. He was compelled to find a way to use that material to purify water. In 1984, he began to develop his ideas and built a series of tanks. The tanks were filled with wastewater, living plants, and living creatures. He called these tanks Living Machines. As bacteria in the tanks broke down waste, they made food for the plants. The bacteria, plants, and fish all **thrived** together, and the wastewater became clean. Todd's work was so successful that in 1989 he won an award from the U.S. government and won the Discover Award for technical innovation in 1991. In 1992 he faced a new challenge.

Water purification system at a chocolate factory

Chattanooga Creek

Pollution is not only ugly, it can kill. For example, the Chattanooga [chat•uh•**noo**•guh] Creek had become so polluted that people living near it were getting sick and even dying. For more than 150 years, factories had emptied chemical wastes into the creek. The result was at least 33 different poisons in the creek water. Some were **pesticides;** others were cleaning fluids and coal tar.

Vo•cab•u•lar•y

thrived (thryvd)—grew strong and healthy

pesticides (**pes**•ti•sydz)—chemicals used to kill weeds or insects

Activated sludge sewage treatment

The problem in Chattanooga, Tennessee, was very serious since more than the water was polluted. The poisons were buried deep in the bottom of the creek bed in thick, black **sludge**. It would take thousands of years for bacteria to break down these poisons. For all that time, more people would be getting sick. If the sludge from the creek bottom was dug up and burned, the smoke and ashes might still be full of poisons. Then these would become part of the air people breathed. Burying the sludge would only move the poisons to another place.

The people of Chattanooga asked Todd for help. So far, Todd's Living Machines had been used only to clean up sewage water. Todd did not know whether his Living Machines would be able to clean up the sludge. But he thought of a plan.

Two Different Tanks

Todd's plan was to have two different tanks: One tank would be a large aquarium and the second, smaller tank would hold **toxic** sludge. Todd had an unusual "recipe" for this smaller tank. He started with 16 **liters** of fresh water (not salt water). He added pieces of rotten wood from old railroad ties. Then he stirred in moldy leaves from a forest floor and included marsh mud that smelled like rotten eggs. Todd also put in bacteria he had bought from a bacteria supply company. He combined all this with 3 liters of Chattanooga Creek sludge.

Vo • cab • u • lar • y

sludge (sluj)—heavy, slimy waste

toxic (**tok**•sik)—poisonous

liters (**lee**•tuhrz)—metric measures equal to slightly more than a quart

Strategy

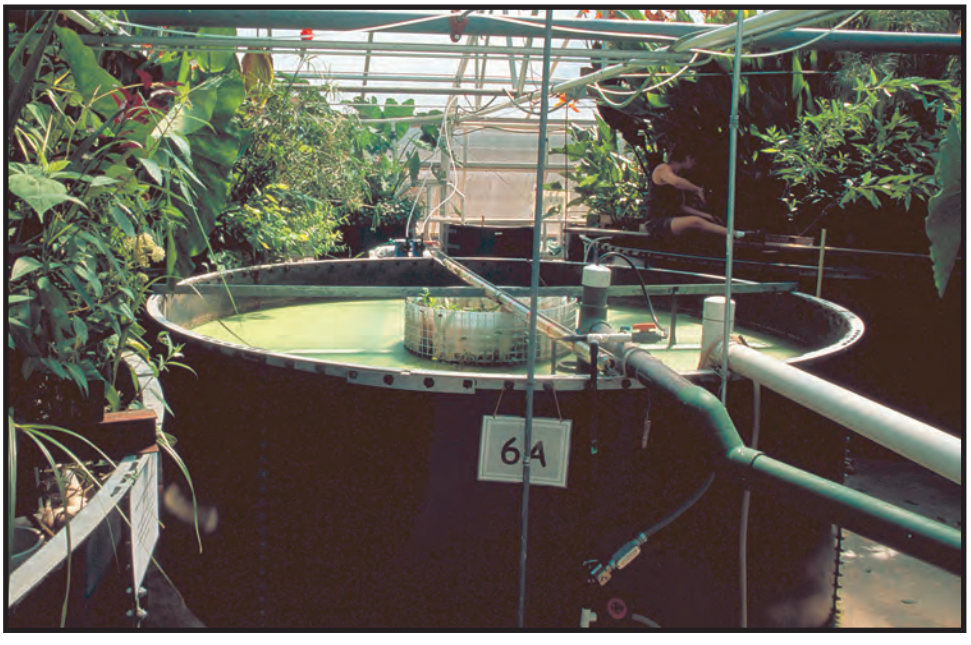
Make Connections
by relating information that I already know about the subject to what I'm reading.

My Thinking

I have a fish tank and understand that conditions must be ideal in order for the fish to survive. Todd wanted ideal conditions for the bacteria.

Todd based his plan to make his strange mixture on the idea that everything in nature is connected. He wanted as many kinds of bacteria as he could have. For example, the marsh mud held a type of bacteria that can live without oxygen, so these bacteria would work on some of the worst **toxins**. The rotten wood held bacteria that could break down the coal tar in the sludge.

Since Todd wanted his bacteria to be very healthy, he designed the Living Machine to give his bacteria super living conditions. Bacteria grow well in a warm climate, so the small sludge tank was always heated. Most microbes need oxygen to live, therefore Todd made sure air was always bubbling through the tank. Finally, he knew the fresh water would **dilute** the poisons in the sludge. Without it, the toxins would kill the valuable bacteria.



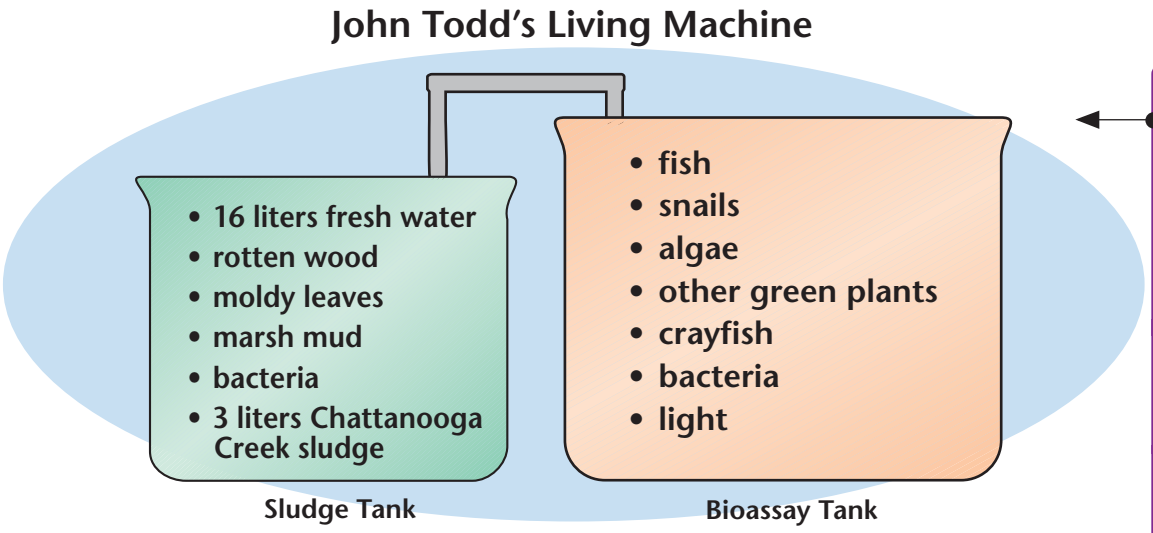
A Living Machine cleaning water inside a greenhouse

Although bacteria will break down almost anything, they do their work very slowly. To make the microbes work faster, Todd decided they should be well fed. He gave them plenty of acetate, which is a type of food. The small tank was now a perfect place for microbes, and they multiplied very quickly. The mixture was stirred three times a day, which gave the microbes the best chance of working together to break down the toxins.

Vo•cab•u•lar•y

toxins—poisonous substances

dilute (dy•**loot**)—thins out or weakens by adding water



Using Text Features

Chart The list of ingredients in the sludge tank is missing some items. Review the information on pp.16–17 and supply the missing ingredients. Then refer to the chart as you tell a partner how the living machine works.

Answer: In addition to the ingredients on the list, Todd made sure the sludge tank had acetate, oxygen, and heat to keep the microbes working.

The other tank was a very large aquarium. This tank held three kinds of fish, snails, **algae,** and many green plants. It also was home to a crayfish, which lives in fresh water and looks like a small lobster. Bacteria existed here, too. The tank was always lighted, so the plants could make oxygen around the clock. This aquarium was called the **bioassay** tank. *Bio* means "living" and *assay* means "test." The idea behind this living test was simple. Todd needed a way to know whether the microbes in the first tank were breaking down the toxins in the sludge. The living things in this tank would be the test. He would add water from the sludge tank to the bioassay tank to test the water's purity.

The First Test

After eight days, Todd was ready for the first test. The small sludge tank had been making foam for three days. The foam was made of millions of bubbles produced by gas that is formed when microbes eat and break down chemicals. This was a good sign.

Todd took a very small amount of water from the bioassay tank and put it in the sludge tank. Then, he took the same amount of water from the top of the sludge tank and put it in the bioassay tank. The next day, four fish in the bioassay tank were dead. This showed that the toxins were still powerful. Todd was discouraged. He wondered whether he should continue. He decided to make another

Vo•cab•u•lar•y

algae (**al**•jee)—a type of plant that grows in water or damp places

bioassay (by•oh•**as**•ay)—a test of biological activity

water exchange. The next day, all the fish were dead. There was still enough poison in just a tiny bit of sludge water to kill the fish.

But there were signs that the water was getting cleaner. The crayfish was still alive and the oxygen-producing plants still seemed healthy. So, Todd continued to exchange water between the tanks every day. As the microbes kept working together to break down the toxins, he exchanged greater amounts of water.

Animals' reproductive patterns can show whether their environment is healthy. Todd noticed, for example, that he could watch the snails to know how healthy the water was. If the snails stopped laying eggs, he knew he was adding too much poison to the bioassay tank. He would stop adding sludge water until the snails were laying eggs again. By the end of the first month, he was exchanging two quarts of water a day. The creatures in the bioassay tank stayed alive and healthy.

The Results Are Reported

It was time for a scientific test. Todd sent two quarts of water from the bioassay tank to a government lab. The results were remarkable. The water was nearly pure! But what about the sludge? Had the Living Machine been able to clean that, too? Todd took the whole system apart. He sent samples of the plants and animals to the lab and most important, he sent the entire contents of the sludge tank.

The results were amazing. More than half of the sludge that Todd had placed in the tank was gone! It had been eaten by microbes. Twenty-one of the 33 poisons were almost gone. The microbes had broken down those toxic chemicals in only 2 months! This wonderful news showed the power of the Living Machine.

There were other results, though, that were not as good. The amounts of 3 of the poisons did not change. Even worse, the lab found that 9 of the toxins had increased. The microbes had probably rearranged some elements to help these toxins grow. Todd was puzzled. He wished he could continue observing the 2 tanks, but the test was over. The results had given him a lot of important information, though. He knew that his idea was a good one, and he considered his test a success.

Strategy

Make Connections by relating information that I already know about the subject to what I'm reading.

My Thinking

I have learned in science class that successful experiments often have some negative results.

Using Nature's Example

John Todd

Todd had proved that his machines could reduce toxic waste. That made the machines popular in different kinds of places. Since Todd's original experiments, living machines have been used in many different places in the United States and around the world. For example, in Vermont, a living machine has been used to treat the wastewater at a tourist information center. In Australia, a system has been used to clean the waste from a food-processing plant. The cleaned water that comes out of these living machines can be used to water farm crops.

One of Todd's goals is to teach people about the environment. His systems are models of our natural world. He hopes that living machines will remind people that nature works in balance. The machines combine light, heat, water, and living things. The living things provide food for each other. They work together to clean up their environment. Todd hopes that if living machines can do that, so can we.

Think About the Strategy

AFTER READING

Recall

by summarizing the selection in writing or out loud.

My Thinking

The strategy says to recall by summarizing what I've read. Sewage is bad for people, but bacteria love it. The Living Machine used bacteria to clean up water that had sewage in it. John Todd showed how the balance of nature can clean up pollution.

Graphic organizers help us organize information. I think this article can be organized by using a problem-solution frame. Here is how I organized the information. I identified the problem in the article. Then, I listed the solution for the problem and its results. Finally, I described the end result. I used my graphic organizer to write a summary of the article.

Problem-Solution Frame

John Todd's Living Machine

Problem Box

What is the problem?	pollution of Chattanooga Creek
Why is it a problem?	pollution of water; people getting sick from poisons
Who has the problem?	the people of Chattanooga, wildlife

Solution Box

Solution	**Results**
John Todd's Living Machine	The first test still showed toxins. The final test showed the water was nearly pure, more than half the sludge was gone, and 21 of the 33 poisons were almost gone. But 9 toxins increased.

End Result Box

John Todd proved his Living Machines could reduce toxic waste. Living machines have been used around the U.S. and in countries around the world.

I used my graphic organizer to write a summary of the article "John Todd's Living Machine." Can you find the information in my summary that came from my problem-solution frame?

A Summary of
John Todd's Living Machine

Cleaning wastewater so it can be reused is a growing challenge, but an oceanographer named John Todd discovered a natural way to do it. He used an aquarium filled with wastewater, plants, fish, and other living creatures. He called this a Living Machine. Todd proved that bacteria in the water could break down the waste, cleaning up the water. The bacteria made food for the plants at the same time. For this, Todd won a Discover Award in 1991.

In 1992, Todd wanted to see if a Living Machine could clean up toxic sludge in the Chattanooga Creek in Tennessee. The sludge was making people sick. He set up two tanks. The larger aquarium held fish, snails, a crayfish, algae, and plants. The smaller tank was filled with water, many kinds of bacteria, and toxic sludge from the creek.

The bacteria in the small tank began breaking down the sludge. After eight days, Todd wanted to check the purity of the water in the small tank. He took a tiny amount of water out of the tank and put it in the aquarium. Then he took the same amount of water out of the aquarium and put it in the tank.

Four fish in the aquarium died, proving that the water still contained strong poisons. The next day, when Todd put a little more water from the small tank into the aquarium, the rest of the fish died. Still, the crayfish, snails, and plants seemed healthy. The bacteria must be cleaning up the water in the tank.

Todd started exchanging larger amounts of water every day. After 2 months, he had water from the small tank tested. Tests showed that 21 of the 33 poisons were almost gone! However, 3 poisons had not changed, and 9 had increased. The process was a great success, even though it did not get rid of all of the poisons.

Living machines have been used in places around the United States and in countries around the world. Todd's system shows that natural processes can help clean our water.

Introduction
Here is how I developed my introductory paragraph. It gives readers an idea of what they are about to read.

Body
I used information from each section of the problem-solution frame for each paragraph in the body of my paper.

Conclusion
I recalled the main ideas in the conclusion.

Developing Vocabulary

Roots

Many words in English come from Greek and Latin **roots**. Knowing these roots can help you unlock the meaning of unfamiliar words. Roots give you clues about the words' meanings.

In "John Todd's Living Machine," you learned that the word *toxic* means "poisonous." **Toxic** comes from the Greek word *toxikon,* which means "poison for arrows."

Here are more words that contain the root *tox* or *toxi:*

Something that is toxic is a *toxin*.

When someone's blood is infected with toxins, that person has *toxemia*.

The study of things that are toxic is *toxicology*.

Someone who studies toxins is a *toxicologist*.

The word *photosynthesis* is also in the reading selection. *Photosynthesis* contains the word root *phot* or *photo,* which comes from a Greek word meaning "light."

Read the words and definitions below. Using your knowledge of the root *photo,* match each word in the first column with its definition in the right column. Write your answers on a separate sheet of paper.

1. photo-essay
2. photograph
3. photocopy
4. photogenic
5. photometer

A. (noun) an image printed on light-sensitive paper; a picture
B. (adjective) suitable for appearing in pictures
C. (noun) a story told mainly by photographs
D. (noun) a reproduction of printed material
E. (noun) a device for measuring light

Readers' Theater

The following script is a public service announcement about water conservation. Pretend you are recording it for a radio station. You can perform it in groups of three or more. When the group is ready, perform the script in front of an audience.

Fluency TIP

A public service announcement is meant to attract attention, so if you are reading the announcer's part, practice sounding persuasive. If you are part of the chorus, practice reading together.

Slow the Flow

Announcer: The following is a public service announcement by the Water Conservation League. Are you looking for ways to save water AND money? Try these quick tips to slow the flow!

Chorus of voices: In the bathroom…

Announcer: …turn off the water while you brush your teeth or shave. Take shorter showers. Five minutes or less is all you need. When you take a bath, don't fill the tub very high.

Chorus of voices: In the kitchen…

Announcer: …scrape, don't rinse, your dishes before washing or loading them in the dishwasher. Run the dishwasher for full loads only. When washing dishes by hand, turn off the water between rinsing.

Chorus of voices: In the laundry room…

Announcer: …buy a water-saving washing machine. Use the shortest wash cycle and the lowest water level possible.

Chorus of voices: All around…

Announcer: …don't pour water down the drain if you can use it for something else, like watering plants. Find leaks and fix them! Do your part to…

Chorus of voices: …slow the flow!

Think About the Strategies

BEFORE READING

Preview the Selection

by looking at the title and headings to predict what the selection will be about.

Write notes on your own paper to tell how you used this strategy.

DURING READING

Make Connections

by relating information that I already know about the subject to what I'm reading.

When you come to a red button like this  , write notes on your own paper to tell how you used this strategy.

Are We Wasting Our WETLANDS?

Tuttle's Marsh, Michigan

Highway construction in Sweetwater Marsh National Wildlife Refuge, San Diego, California

The shallow waters of a swamp shine in the sun where ferns spread their soft leaves and soil shows through the water and grasses stand tall. A long-legged heron strides through the water hunting frogs. Ripples spread in a long, smooth line across the quiet wetland. A water snake weaves its way through moss and other plants.

Suddenly a rumble breaks the stillness. A bulldozer plows through the reeds as dump trucks follow. Soon, the swamp is filled with layers of gravel. A year later, a new mall sits where the heron once nested. Where has that heron gone? A hard, black parking lot has spread across the ground. Where are the ferns and cattails? Another wetland has disappeared.

Strategy

Make Connections by relating information that I already know about the subject to what I'm reading.

Write notes on your own paper to tell how you used this strategy.

Is the Problem Serious?

The U.S. Fish and Wildlife Service, which keeps track of wetlands, reports that 58,500 **acres** of wetlands in the United States are destroyed each year. As time goes on, wetlands are disappearing faster and faster. Should we be worried? The answer lies in the nature of wetlands themselves.

What Is a Wetland?

Wetlands are low places where water and land come together. They can have fresh water or salt water. You can find freshwater wetlands at the edges of lakes, ponds, streams, and rivers. About 90 percent of the wetlands in the United States are freshwater. Saltwater wetlands are found near coasts in areas that are protected from waves. Wetlands are found every place on Earth except Antarctica. Some are in the hot tropics; others are in cold places. There are many different names for wetlands: marshes, swamps, fens, playa lakes, pocosins, and prairie potholes to name a few. Each type has its own kind of water, soil, plant life, and animal life.

Marshes are flooded by either fresh water or salt water. Some marshes are always flooded. Others are flooded from time to time. Only a few types of plants can grow in marshes. They include cattails and some kinds of grasses. These plants are able to live in water or very wet soil. The type of water in the marsh depends on where the water comes from. The water in saltwater marshes comes from ocean tides. In freshwater marshes, it comes from groundwater, streams, and rain.

Swamps are another type of wetland. Like marshes, swamps may be flooded all year or just a small part of the year. Swamps can be seen at the floodplains of rivers, in shallow parts of lakes, and along coasts. Most plants in swamps are trees and shrubs.

Peat **bogs** are also considered a wetland. In peat bogs, plants such as moss and grass grow very fast. They grow faster than they rot, which results in a buildup of rotted plant material. This material is called peat.

Vo•cab•u•lar•y

acres (**ay**•kuhrz)—measures of land

bogs (bawgz)—marshes made of peat

Are Wetlands Wastelands?

Wetlands have been on Earth for thousands and thousands of years. In the past, people did not think wetlands were important. People used wetlands as dumping grounds for all kinds of junk. Many wetlands were also drained or filled in to make room for houses, malls, farms, and highways.

Many wetlands smell like rotten eggs! People thought that building things on this smelly, useless land meant progress. They were proud to eliminate the odors and reclaim the land for human use. If humans were reclaiming the land, who or what had claimed it before?

Sierra Club members paddle canoes through layers of water hyacinth in the Atchafalaya Swamp in Louisiana.

A Home for Wildlife

Wetlands are important for the well-being of many animals and plants. Millions of birds and other animals make their homes in wetlands. Reptiles such as turtles, snakes, and alligators are commonly found there. Frogs, salamanders, and toads are **amphibians** that live in wetlands for at least part of their lives. Many kinds of fish depend on wetlands for food and safety, and birds visit wetlands to find food, to rest, and to make their nests. Raccoons, beavers, **muskrats,** and other animals also make their homes here in wetlands. Many reptiles, amphibians, fish, birds, and plants that live in wetlands are endangered species, which means they are in danger of disappearing completely from the earth.

Alligator and turtle sunning in the Florida Everglades

Strategy

Make Connections by relating information that I already know about the subject to what I'm reading.

Write notes on your own paper to tell how you used this strategy.

Using Text Features

Chart What information is listed in the left column of the chart? What information is listed in the right column? In which column would you list another kind of endangered fish?

Endangered Species of the Wetlands

amphibian	four-toed salamander
bird	snowy egret
mammal	river otter
invertebrate	elfin skinner dragonfly
fish	spotted sunfish
plant	grass pink orchid
reptile	spotted turtle

Vo•cab•u•lar•y

amphibians (am•**fib**•ee•uhnz)—cold-blooded animals that live in water and breathe air

muskrats (**mus**•krats)—large rodents that live in water

shellfish beds—breeding grounds

The fish and shellfish that live in wetlands are important sources of food for humans. **Shellfish beds** and fishing areas depend heavily on excellent water quality. Without healthy wetlands, these food sources can be lost. Wetlands are important for many other reasons as well.

A Help for Humans

Wetlands are valuable to people, too. For example, low wetland areas act as sponges during storms. They help control floods by storing water and letting go of it slowly, which minimizes flood damage to nearby roads and buildings. Along the coast, wetlands prevent ocean waves from washing away beaches. If wetlands didn't exist, people would need to build expensive systems and sea walls to prevent floods and **erosion**.

Another way wetlands help people is by purifying and supplying water. In freshwater wetlands, surface water seeps into the ground and adds to the water that already exists. Wells for homes and communities use this water.

Wetlands also serve as natural filters because their soil and plants trap toxic materials. In some cases, they can break down these materials and make them **nontoxic**. This filtering can drastically improve water quality.

Wetlands are special places for recreation. People enjoy bird watching, fishing, hiking, and canoeing in these peaceful, lovely areas.

Wetlands can be used as **laboratories** for scientists and other interested people. They possess a great deal of information about science and history. In a peat bog in

Boardwalks let people enjoy wetlands without harming them.

Vo•cab•u•lar•y

erosion (i•**roh**•zhuhn)—the process of wearing or washing away

nontoxic (non•**tok**•sik)—not harmful

laboratories (**lab**•ruh•tor•eez)—places where scientific tests and experiments are done

Strategy

Make Connections by relating information that I already know about the subject to what I'm reading.

Write notes on your own paper to tell how you used this strategy.

England, scientists found the body of a man who lived about 300 B.C. Because of the quality of the soil in the bog, the body was very well preserved. Scientists have been able to learn a great deal about this man. For example, they could tell what he had eaten at his last meal and what his blood type was. They even learned that he had had a haircut! Thousands of bodies have been found in bogs throughout Europe. These discoveries have helped scientists learn more about the times in which these people lived.

Saving the Wetlands

As you can see, wetlands affect almost everyone. Luckily, people realized how important wetlands are before time ran out. In the early 1980s, wetland science became a separate field of study. Better information about the importance of wetlands became available. People's attitudes began to change. Scientists experimented with ways to return destroyed wetlands to their natural states. Across the country, laws were passed to protect and preserve wetland areas. However, laws can help only if they have community support. It is important to stay informed. You know why wetlands need to be saved. Now you need to know what to do—and what not to do—to protect this valuable resource.

Disposing of hazardous materials properly protects our water supply.

Ways to Learn More

The more you know about wetlands, the more you can help. There are many different ways you can learn about wetlands.

- Visit one of the almost 400 National Wildlife Refuges in the United States. There you can often find educational programs for the public.

- Along the coast, National **Estuarine** Reserve Research Areas have visitor centers. They may have tours, educational programs, and workshops.
- Local conservation groups are active in many areas. They can help you learn more about local issues and laws. They can teach you about what is being done to clean up wetlands in your area.
- Most city and town councils hold regular open meetings. Often, these councils hear from builders who want to develop property. They hear from people who want to open new businesses. Such groups think about the fate of wetland areas when they make decisions about these issues. Ask your parents to attend meetings, and go with them.
- The Environmental Protection Agency is an excellent source of information on wetland protection.
- Many nonprofit organizations work to protect wetlands and other endangered areas. For information on their work, contact groups such as the National Audubon Society and the Nature Conservancy.

What You Can Do

Even one person can make a difference. Here are some examples of things you can do.

- Create a display explaining why wetlands are important and need to be saved. Arrange to exhibit the display in your school, public library, or city hall.
- Join or start a group to clean up a local wetland or river.
- Find out whether weed killers and other toxins are used in local parks and along roadsides. Write a letter asking local officials to cut back on their use. When it rains, these chemicals pollute groundwater, lakes, and rivers. This pollution destroys plants and endangers fish, birds, and animals.
- If you live in an area with cold, snowy winters, ask officials to use less salt, or to use sand instead of salt, on the roads. Saltwater runoff kills freshwater plants and animals.

Vo • cab • u • lar • y

estuarine (**es**•choo•uh•ryn)—located near where a river meets the sea

Make Connections by relating information that I already know about the subject to what I'm reading.

Write notes on your own paper to tell how you used this strategy.

- If you live near a waterway, do a survey. Find out what is being dumped into the water and who is dumping it. Farms often use great amounts of pesticides and **fertilizers**. Factories may dump toxic wastes into storm sewers. This is against the law. If you see illegal dumping, tell an adult.
- If you live in a rural area and see a situation that harms a wetland, report it to the Environmental Protection Agency. Check the website for information on how to do this.
- When issues about wetlands come before the U.S. Congress, let your voice be heard. Write to your representative and senator. You can get their names and addresses at the library.
- Express your opinions and ideas to state legislators. Introduce yourself in a letter or on the phone. Tell why you are for or against the issue. Be specific about what you want done.

What You Should Not Do

One person's harmful actions can add to the problem. Here are some examples of things you should not do.

- Don't use weed killers, pesticides, and other harmful chemicals inside or outside your home. Through runoff, they end up in our water supply.
- Never pour motor oil, paint, or cleaning fluids down the drain. Never pour these things onto the ground or down a storm sewer. Again, these will enter the water supply and pollute groundwater.
- Try not to let a dog or other pet leave its waste in or near a stream. Animal waste can pollute the water.
- Do not waste water. Did you know that you could save ten gallons of water a day by shutting off the water when you brush your teeth? Replacing older toilets with new low-flow toilets can save lots of water. Placing a brick in the tank of older toilets can also save water.
- Do not waste electricity. The production of electricity pollutes our waterways and wetlands.

Vo•cab•u•lar•y

fertilizers (**fur**•tl•y•zuhrz)—chemicals put in soil to feed plants

Great blue heron in Florida's Everglades National Park

One Last Thing

More than half of this country's original wetland area has been lost to farming and urban growth. Time is running out for our wetlands. We must act now to save what is left before wetlands are gone forever.

Think About the Strategy

AFTER READING

Recall

by summarizing the selection in writing or out loud.

Write notes on your own paper to tell how you used this strategy.

Developing Vocabulary

Analogies

An **analogy** is a kind of comparison. It tells how things are alike. Signal words, such as *similar, like,* and *as,* can help you spot analogies. Analogies check how well you understand vocabulary, or word meanings.

This sentence is from "Are We Wasting Our Wetlands?":

> *Wetlands can be used as laboratories for scientists and other interested people.*

The author compares wetlands to laboratories. She is saying that wetlands are places where scientists can do research just as they do in laboratories.

If the above comparison were made into an analogy, it might look like this:

> *Wetlands* are to *laboratories* as *museums* are to *classrooms.*

An analogy indicates that the relationship between the first pair of things (wetlands and laboratories) is similar to the relationship between the second pair of things (museums and classrooms). It is up to you to figure out what the two pairs have in common. In this example, wetlands can be laboratories, and museums can be classrooms.

Choose a word from the selection to complete each analogy. Write each complete analogy on a separate sheet of paper.

erosion **pure** **acre** **muskrats** **laboratory**

1. *Gallon* is to *water* as _____ is to *land.*
2. *Clean* is to *polluted* as *dirty* is to _____.
3. _____ are to *beavers* as *mice* are to *rats.*
4. *Wind* is to _____ as *water* is to *floods.*
5. *Garage* is to *mechanic* as _____ is to *scientist.*

Speech

Practice reading out loud the speech by Courtney Michaels. Once you are comfortable with the text, perform it for an audience.

Fluency TIP

As you practice the speech, be sure to convey urgency in your voice. Remember, you are trying to convince your audience to take action.

Wetlands Are Wonderful

Excerpts from the speech by conservationist Courtney Michaels to the Young Fishers' Club

Wetlands are perfect homes for many types of plants and animals. Without wetlands, many animals and plants would have nowhere to live. Also, wetlands help absorb floodwater caused by big storms. So, wetlands help to save our human homes, too.

What if I told you today that we may be in danger of losing our wetlands? Even worse: that we are the cause? W e have destroyed many wetlands in order to make room for shopping malls and housing developments. Many plants and animals have lost their homes because we decided we wanted to build over wetlands. Imagine if someone destroyed your home so that they could build something over it! There are many things you can do to help:

- Tell your friends why wetlands are important.
- Clean up neighboring wetlands by joining an environmental group.
- Write a letter to your congressperson urging extra care for our wetlands and the homes they provide for many species. Do your part to keep our wetlands wonder ful!

Think About the Strategies

BEFORE READING

Preview the Selection

by looking at the title and headings to predict what the selection will be about.

DURING READING

Make Connections

by relating information that I already know about the subject to what I'm reading.

AFTER READING

Recall

by summarizing the selection in writing or out loud.

Use your own paper to jot notes to apply these Before, During, and After Reading Strategies. In this selection, you will choose when to stop, think, and respond.

Taking Care of Our Mother, the Earth

O our Mother the Earth, O our Father the Sky,
Your children are we, and with tired backs
We bring you gifts.
—Song of the Sky Loom (Tewa)

The Earth Is Our Home

Like many Native Americans, the Tewa people honored and protected the land. They thought of the earth as their mother. R. Buckminster Fuller—an **architect** and engineer—looked at the earth in another way. In 1964, he wrote, "I am a passenger on the spaceship Earth." Fuller saw the earth as a ship carrying us on a journey through space. As passengers on this spaceship, we are responsible for its care. A scientist named James Lovelock proposed that the planet is alive. To him, it is a living thing that keeps the environment suitable for life. Mother, spaceship, or living planet, Earth is our home. It is obvious that its system is finely balanced and complex. When any part of the system is altered, it is difficult to guess what the results will be.

Vo • cab • u • lar • y

architect (**ar**•ki•tekt)—
a designer of buildings

Steelworks producing smog near the city of Aviles, Spain

Human Mistakes

Long before people lived on Earth, the planet existed. Forests grew, rivers flowed, and clean rain fell—all undisturbed by humans. Today, more than 6 billion people live and work on Earth. For years, many people gave little thought to what the planet needed. If it didn't meet their needs, they changed it. Because most people didn't know any better, the planet was harmed in many ways. We cut down forests, dumped poisons into rivers, polluted the air, and wasted resources. We now know that what we do to one part of Earth affects the whole planet. It also affects every living thing on it.

We must try to repair past mistakes and keep from making new ones. To do that, we must learn about Earth's systems and how what we do affects them.

Disappearing Forests, Disappearing Species

Everything we do affects Earth's **environment**. Every time we eat, drink, or breathe, we use the environment. In itself, this is not bad. All living things use the environment. The harm comes when we take too much, waste resources, or destroy them.

Some people saw the connection between humans and nature a long time ago. For example, on his second voyage to the New World, in 1494, Columbus was impressed with Jamaica's dark, misty forests and cloud-wrapped peaks. He noticed that every afternoon there was a rainstorm that lasted for about an hour. Columbus compared Jamaica to other **tropical** islands he was familiar with. Although those islands also once had great forests, they had been cut down. Columbus thought that those islands had less rain since the forests were cut.

As it turns out, Columbus's ideas were correct. Scientists have found that much local rainfall begins as water in the soil. Groundwater **evaporates** and forms

Vo•cab•u•lar•y

environment (en•**vy**•ruhn•muhnt)—surroundings

tropical (**trop**•i•kuhl)—located in the tropics

evaporates (i•**vap**•uh•rayts)—changes into vapor

clouds, and water in the clouds falls back to the ground as rain. When a forest is cut and the trees are no longer there, the soil dries up. Then the cycle ends.

Tropical forests are destroyed for many reasons. Logging companies clear trees to sell the wood for furniture. Explorers tear through the trees in search of precious metals, such as gold and silver, as well as oil. But the biggest cause of the destruction of the tropical forests involves developing countries that wish to increase land for crops and for cattle to **graze**. All of the reasons involve creating roads for better access.

It is estimated that tropical forests are disappearing at a rate of one and one-half acres every second! Almost half of the world's species of plants and animals live in tropical forests. The lack of rain causes these plants and animals to die. Scientists fear that the destruction may cause many unidentified species to vanish with their **habitat**.

We have caused many living things to become extinct. We have placed thousands of species of animals in danger. Scientists estimate that as many as 137 species might disappear each day—that's 50,000 species a year!

A destroyed rain forest

Waste and Pollution

Humans have not always been careful with natural resources. For example, we waste water by letting faucets run and by watering lawns. We pollute rivers, streams, and groundwater with garbage and toxic wastes. Fumes from our vehicles and factories pollute the air. High levels of these fumes in the atmosphere may be changing the climate of the entire planet.

Global warming is caused by an increase in the amount of carbon dioxide in the atmosphere. It can create many problems. For instance, **glaciers** are shrinking, and the polar ice caps are melting, which raise the levels of the

Vo•cab•u•lar•y

graze (grayz)—to feed on grass

habitat—place where living things live

global warming—an increase of the earth's average temperature

glaciers (**glay**•shuhrz)—huge masses of ice that flow over land

Tornadoes can be caused by changes in climate.

oceans. Rising sea levels may eventually flood coastal areas. Floods, droughts, hurricanes, and tornadoes are among the natural disasters that can be caused by changes in the earth's climate.

Toxins in the air and other chemicals may be damaging the ozone layer. The ozone layer of the atmosphere protects living things from the sun's harmful rays. Without this protection, many life forms—including humans—are in danger.

In the name of progress, we have changed the landscape. We have cut down entire forests for lumber and farmland. This action destroys wildlife habitat. It causes erosion and flooding. We have dammed rivers to produce electricity. Lakes formed by dams have flooded huge areas. Fish that are stopped by the dams can't reach their **breeding** grounds. We have changed the course of rivers to water farmland, and this has formed deserts where the water used to flow. It has added salt to the soil, making the land **barren**. We have filled in swamps and built malls. The many animals and plants that lived in the swamps are gone.

How have we let this happen? Have we been careless? Part of the problem is that we often don't know the harm we are doing to the environment until it is too late. Two examples are the building of the Aswan Dam and the clearing of the Amazon rain forest.

Aswan High Dam

In the 1960s, President Nasser of Egypt dammed the Nile River to control its yearly flooding and to produce electricity. "The miracle has been wrought," he said. The dam did stop the floods, but it also blocked the flow of **silt** that enriched the soil of farms along the Nile, so farmers had to start using chemical fertilizers.

The lack of the silt that flowed from the Nile into the Mediterranean Sea caused many problems. It increased erosion along the coast, and it harmed wildlife. Sardines and shrimp were two species that lived in the sea. After the dam was built, they could not get their normal food—

Vo•cab•u•lar•y

breeding—giving birth to young

barren (**bar**•uhn)—not producing crops or fruit

silt—tiny particles of soil or sand floating in or left by water

organic matter in the silt. As a result, the fish died and Egypt's sardine industry failed.

Rodents that had been kept in control by the yearly floods increased in numbers. Sewage systems that were cleansed by the floods became clogged, and farmland below the dam no longer drained properly. It became so salty and useless that farm production decreased by half. The "miracle" turned out to be a disaster for Egypt.

Aswan High Dam, Egypt

The Amazon Rain Forest

In Brazil, most people live in crowded cities along the coast. Decades ago, the government wanted people to move inland. Settlers were encouraged to clear land in the Amazon rain forest for farms. People thought that because the jungle was so **lush,** its soil had to be rich. However, settlers found that when stripped of its trees, the forest's soil was poor. Crops did not grow well, and rain washed away what little soil there was. Many settlers gave up and returned to the cities. But the damage had been done.

People burned the trees to clear much of the land. The fires added huge amounts of carbon dioxide to the air. Dense, black smoke clouds blocked the sun's light over vast areas. Many people in the area developed lung diseases. Even today, space shuttle astronauts can see the fires burning in the rain forest.

Why should anyone care? The Amazon rain forest plays a major role in the earth's climate, and its trees and other plants absorb the carbon dioxide that causes global warming. In turn, the plants give off oxygen, enriching the air we breathe. As the rain forest disappears, the atmosphere has more carbon dioxide and less oxygen.

Also, scientists have found many important medicines in rain forest plants that are used to fight different types of cancer. What other wonders have not yet been found?

Vo • cab • u • lar • y

organic (or•**gan**•ik)—of or coming from living things

lush—covered with thick, healthy growth

Lush tropical rain forest

INSET
Brazilian rain forest being burned to make farmland

No one knows. Scientists worry that as plants are destroyed, many life-saving drugs may also be lost. At the rate in which rain forests are currently being destroyed, between 80 and 90 percent of these forests will no longer exist by the year 2020.

The Power of the People

Some people are still ignoring the damage that is being done to the earth. However, many others are taking responsibility for the care of the planet. Planet care and repair is a huge job, but it's not an impossible one, if enough people are determined to work at it.

It takes only a few people to create change. Ordinary people start things moving. Then the movement grows until it has the power to bring about changes. Here is one example.

Some years ago, news came out about tuna fishing. When fishers cast their nets to catch tuna, dolphins got caught in the nets, too. Each year more than 100,000 dolphins were accidentally drowned in nets. People began to protest this senseless killing. They **boycotted** the tuna-canning industry. Great numbers of people stopped buying tuna. The boycott was a success. In 1990, the three major canners of tuna sold in the United States made an announcement. They decided that they would no longer buy or sell tuna caught by

Students rally to support environmental concerns.

Vo • cab • u • lar • y

boycotted (**boy**•kot•id)—protested by refusing to buy or deal with

methods that also killed dolphins. Tuna fishers had to change their ways or lose business. The power of the people worked, and dolphins' lives were saved.

It's Up to You

You may have heard the saying "A journey of a thousand miles begins with a single step." The task of repairing our planet can begin with a single act. This act can be as small as not letting the water run when you brush your teeth. It can be as big as passing a law to protect the environment.

You can put your efforts to work on behalf of the earth. Set a good example for others. Try not to waste water or electricity. Practice "precycling"—refusing to buy or use goods with **excess** packaging. Recycle glass, cans, plastic, and paper.

Share the information you have learned about planet Earth. Tell your parents, your friends, and your classmates. Urge them to learn more themselves and to begin caring for our planet.

Seventh graders sort materials as part of a recycling project.

Start Changing the World

- Find out if your school uses recycled paper.
- Find out if your school recycles waste.

- Write a letter to your local newspaper to recommend ways to help the environment.

- Write to your senators, representatives, or the president. Help them make important decisions about our planet.

- Get involved by joining groups that are trying to save the environment.

Vo•cab•u•lar•y

excess (**ik**•ses)—more than what is needed

Developing Vocabulary

Eponyms

The words that come from people's names are called **eponyms**. Many eponyms come from inventors whose names were used to name their inventions. Some eponyms were named for the first people to do a particular thing.

In "Taking Care of Our Mother, the Earth," you read about a boycott of canned tuna. Did you ever wonder where an eponym like *boycott* came from? It is from Charles C. Boycott. When Boycott refused to lower the rent on his property, people refused to associate with him. Today, that is called *boycotting*.

Samuel A. Maverick was an American pioneer who did not brand his calves. At the time, everybody branded their calves. Today, *maverick* means "a person who does not go along with everyone else."

The opera singer Nellie Melba has two popular foods named for her: *melba* toast and peaches *melba*.

Find the eponyms that are derived from the famous names. Write your answers on a separate sheet of paper.

1. Antoine Sax was a Belgian musical instrument maker.
2. John Montagu, the 4th Earl of Sandwich, liked to eat food informally.
3. Étienne de Silhouette was so stingy, he would only pay for an outline of his portrait.
4. John Macadam was an Australian chemist who studied nuts.
5. Daniel G. Fahrenheit wanted to know more about temperature.

Speech

Practice reading out loud the speech by Chief Seattle. When you are comfortable with the text, perform it for an audience.

Fluency TIP

Read the speech in a slow and deliberate manner so that the audience can hear and think about the important words you have to share.

Chief Seattle and Sacred Land

The United States wanted to buy Native American land in order to build neighborhoods for new settlers. So in 1852, Chief Seattle agreed to sell the land. He gave one condition: the United States government must promise to take care of the land. Chief Seattle said:

> *If we sell you land, you must remember that it is sacred, and you must teach your children that it is sacred.*

Chief Seattle saw Earth as *living*. He believed that human beings should care for the earth. He wanted to set a good example for the United States.

Today, it seems that some people do not abide by the promise that was made to Native Americans many years ago. People have forgotten that Earth is sacred. We pave over green grass with concrete. We turn the earth gray to make room for our expanding neighborhoods and office districts. Of course it is valuable to develop land into areas where humans can live by changing the environment. Still, we always need to be aware of what we are doing.

What if one day we wake up and realize that there are no more natural areas left on Earth? Then we will not only have no room for building, but we will not be able to walk among trees in forests or have flowers in parks.

READING in the Real World

Steps in a Process

Recycling Newspapers

With the help of an adult family member, you can recycle useless old newspapers into special handmade paper at home.

Gather these supplies:

old newspapers
a blender
hot water
a wire clothes hanger
old pantyhose
a bowl
paper towels
an iron
a cutting board

Do this:

1. Tear the newspaper into tiny pieces, and put them in the blender.
2. Add enough hot water to cover the pieces, and let the mixture sit for about 10 minutes.
3. With the help of an adult, run the blender until the paper turns into a smooth mixture.
4. Bend the bottom of the clothes hanger into a round hoop.
5. Cut one leg off the pantyhose, and slip the hoop inside it to make a screen.
6. Hold the screen over the mixing bowl and pour the paper mixture onto the screen. You might need an extra pair of hands to help with this step.
7. Spread the mixture evenly around the screen, and wait until most of the runny part has drained into the bowl.
8. Place the screen on a paper towel, and put another towel on top, like a sandwich.
9. Push on the paper towel to squeeze more water out of the mixture. Repeat several times, replacing the soaked paper towels with dry ones.
10. Place the paper towel sandwich on the cutting board and iron it as dry as possible. This is another time when you need an adult to help you. Be very careful.
11. Peel off the top paper towel, and then peel your new paper off the screen.
12. Let the new paper dry completely while you think of a fun way to use your handmade paper!

Discussion Questions

Answer these questions with a partner or on a separate sheet of paper .

1. In this activity, what is the meaning of the word *screen*?

a. the flat surface on which a television show appears
b. a frame with small holes in it that allow some material to pass through
c. a tall, wide object that protects an area from view
d. to guard from danger

2. In this activity, what do you do after you turn on the blender?

3. You know—or can figure out—how to turn on a blender . Why do you need an adult to help you?

4. What could you do if you did not have a blender?

a. You could let the water drain into the sink.
b. You could use a microwave oven.
c. You could stir the water and paper by hand.
d. You could use a toaster oven.

5. What is the purpose of the cutting board?

a. to use while cutting the newspaper into pieces
b. to help dry out the paper
c. to help shape the hanger into a hoop
d. to protect the table or counter from the hot iron

6. What would happen if you did not add water to the blender?

7. What would help you make a larger piece of recycled paper?

a. Make a larger screen.
b. Add more water to the newspaper.
c. Do not take all the water out of the recycled paper .
d. Do not iron the paper towel sandwich.

8. Why isn't all old newspaper recycled using this method?

CONNECTING to the Real World

EXPLORE MORE

Write a Brief Report

Discuss other methods of purifying polluted water. Include one or more diagrams that show the steps used to clean water in each method.

Work in Small Groups

Research the history of one wetland and make a poster to present its story. If possible you may show photographs you have taken of a wetland in your community.

Perform a Skit

Present how people can correct environmental mistakes and take care of planet Earth. Make a program to distribute at the presentation that gives suggestions about what audience members can do to help the earth.

Write a Brief Fictional Account

Describe what it would be like to work with John Todd. Include what your daily responsibilities would be and what you would expect to learn from the scientist.

Write and Perform

Sing a song to the class that encourages them to take a responsible role in protecting the environment.

Write an Investigative Report

Explain what actions your community is taking in order to correct environmental mistakes and prevent future ones. Contact your local recycling department, parks and recreation department, and even the local fire department.

Related Books

Beatty, Richard. *Wetlands*. Raintree Steck-Vaughn, 2002

Cole, Melissa S. *Wetlands*. Blackbirch Press, 2003

Coombs, Karen Mueller. *Flush! Treating Wastewater*. Carolrhoda Books, 1995.

Galko, Francine. *Wetland Animals*. Heinemann Library, 2003.

Gray, Shirley W. *Wetlands*. Compass Point Books, 2001.

Markle, Sandra. *The Kids' Earth Handbook*. Atheneum, 1991.

Pollock, Steve. *Ecology*. Dorling Kindersley, 2000.

Richardson, Adele. *Wetlands*. Bridgestone Books, 2001.

Taylor, Barbara. *How to Save the Planet*. Franklin Watts, 2001.

Interesting Web Sites

John Todd

http://toddecological.com
http://www.time.com/time/reports/environment/heroes/heroesgallery/0,2967,todd,00.html
http://www.rps.psu.edu/0009/machine.htmlhttp://
http://www.oceanarks.org

Wetlands

http://www.fws.gov/wetlands
http://www.epa.gov/OWOW/
http://www.mbgnet.net
http://www.edutopia.org/wetland-ecology-technology-video

Want to do your part?

http://www.enature.com
http://www.eco-pros.com
http://www.theplastiki.com
http://www.pbs.org/journeytoplanetearth/
http://www.kids.nceas.ucsb.edu
http://www.educators.fws.gov/students.html
http://www.discovery.com/earth
http://www.nwf.org/kidzone/

Web sites have been carefully researched for accuracy, content, and appropriateness. However, teachers and caregivers are reminded that Web sites are subject to change. Internet use should always be monitored.