Watery Earth Unit Teacher Masters: Table of Contents

Introductory Letter to Families

Teacher Masters

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Family Links

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Dear Families,

Your student is beginning a science unit called Watery Earth. During this unit, your child will think about global and local water resources. Students will learn about the water cycle and how Earth's water is distributed. They'll learn that water on Earth is abundant, but realize that there is a limited about of fresh, clean water available for people to use and that we must protect the water on Earth from pollution and overuse. The most important goal of the Watery Earth unit is to encourage students to use what they learn about water to make choices and take actions in their own life that have a positive impact on water resources.

During the Watery Earth Unit, your child will participate in the following classroom activities:

- Discover that Earth's water exists in large and small bodies of water on Earth's surface, in aquifers underground, in frozen glaciers and ice caps, and as vapor in the air.
- Build models of the water cycle to demonstrate evaporation, condensation, precipitation, and percolation.
- Learn about where their tap water comes from, how it is made drinkable, and where it goes after use.
- Discuss the essential and non-essential ways their family uses water and explore water conservation strategies.
- Learn about different types of water pollutants and various treatment methods.
- Investigate an issue pertaining to protecting water resources, take action to positively impact that issue, and communicate their accomplishment.

You and your child can explore this rich topic together in the following ways:

- Read water-related **science books** from the class Science Center or the local library together.
- Visit the curriculum **web site** at ***www.ScienceCompanion.com/Links*** to find a list and descriptions of recommended web sites about water.
- Peruse the **student reference book**, which provides reading selections, pictures, and other resources that enhance what your child learns in class.
- Work together on the **Family Link** activities and homework.
- Repeat and vary some of the activities done in class while you encourage their independent experimentation.

The Watery Earth unit will inspire your student to use their knowledge of water as a limited and precious resource for thoughtful action and positive change. I hope your child will bring their discoveries and enthusiasm home, inviting you to learn alongside them—asking questions, discussing their work, and sharing their adventures in science.

Sincerely,

Name: _____ **Date:** _____

Water Stories

Prompts

The following questions might help you think of a water story to share.

Have you ever…

- Visited a waterfall?
- Been on a boat, canoe, or kayak?
- Swum in an ocean, lake, river, stream, or pool?
- Been caught outside during a rainstorm?
- Been outside on a very foggy day?
- Splashed in puddles?
- Seen a beautiful fountain?
- Listened to the sound of waves or raindrops?
- Wondered whether a lake was natural or human-made?
- Stayed in the bathtub for a very long time?
- Seen a well, a dam, or a reservoir?
- Played in a sprinkler?
- Seen an open fire hydrant?
- Slid on ice?
- Gone to a water park?

Name: _____ **Date:** _____

Water Stories

Sensory Memories

To help you describe your water story with details, close your eyes and think about the setting of your story. Then open your eyes and jot down notes under the topics listed below. Use these details when you tell your story.

What the place looked like:

What it smelled like:

What sounds I heard:

What I touched or tasted:

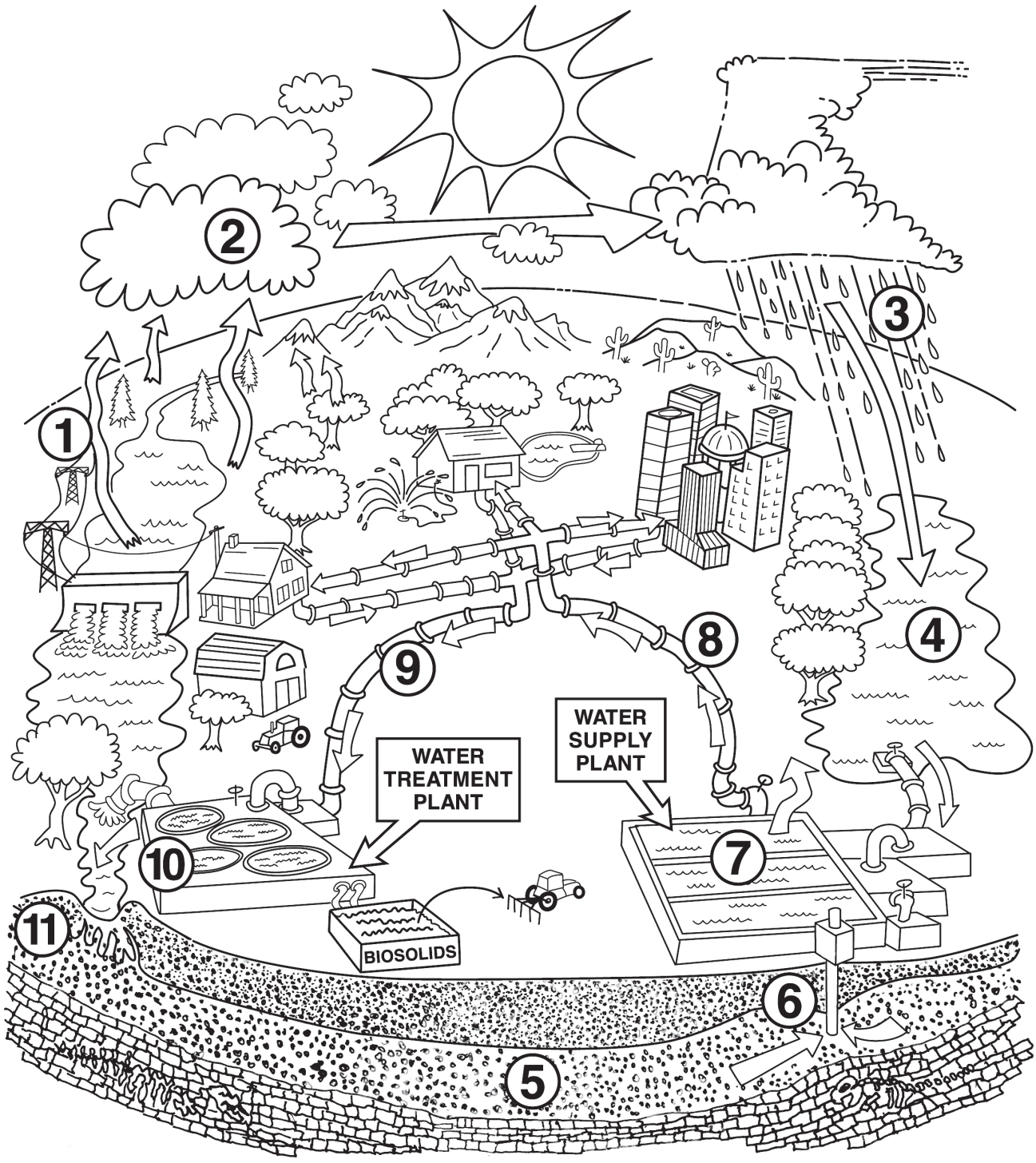
What did those things feel or taste like?

How I felt about this place and experience:

Ideas and Questions About Water

As students learn about water on the earth, use this sheet to record any thoughts, ideas, or questions they have that they might want to study in more detail at the end of the Watery Earth Unit. Add items to the list at any point during the unit.

City Water



Adapted from Environmental Protection Agency, Region 6 poster

City Water

Steps in the Process

1. Water evaporates from surface water and the ground.
2. Water vapor rises and then condenses to form clouds.
3. Precipitation falls to surface water and the ground.
4. Surface water accumulates and acts as a reservoir for the city.
5. Groundwater accumulates and acts as a reservoir for the city.
6. Water is pumped from surface water and groundwater to a water supply plant.
7. Water supply plant cleans and stores water.
8. Water supply system pipes water to homes and businesses.
9. After use, wastewater system pipes wastewater to a treatment plant.
10. Wastewater treatment plant cleans wastewater.
11. After treatment, water is piped to open ground or a body of water.

Water Supply System

The following contains general information about how communities get their tap water. You can use this information in your classroom in the event that you are unable to schedule a field trip to a facility or agency responsible for your county, city, or town's drinking water supply or can't arrange for an expert visitor.

Teacher Note: For information pertaining to your specific community's drinking water, try searching the Environmental Protection Agency web site. The web site contains information about the drinking water in much of the United States. Use your web browser to search for "EPA local drinking water information" or "EPA watershed information." These sites contain information that should help answer many of the questions from your students.

The following are the three major steps involved in getting drinking water to a population:

1. There must be a water source.
2. The water must be treated so it is safe to drink.
3. Their must be a way to store the water and then deliver it to each residence or business.

Water Source

Most communities get their drinking water from a reservoir or an aquifer. A reservoir is a natural or artificial lake or pond that is used for the storage and regulation of water. Many communities have either natural or human-made reservoirs. The reservoir may contain water pumped from a distance, either from a lake or river, it may be pumped from an aquifer, or it may be fed by neighboring surface water. Many communities also rely on deep wells to access groundwater in aquifers.

Water Supply System

Water Treatment

Water may be treated differently, depending on the quality of the water that is available. Groundwater, for example, normally requires less treatment than water from lakes and rivers. This is because water is naturally filtered and cleaned as it seeps into an underground aquifer. So although the treatment of your community's water may differ, the following are the steps involved in a typical water treatment process:

1. Preliminary Treatment—Water passes through filters to remove large floating debris such as leaves, sticks, and paper from surface water.
2. Coagulation—Removes dirt and other particles suspended in water. Water is mixed with chemicals, such as alum, to form tiny sticky particles which attract the dirt particles. When combined, the dirt and chemicals become heavy enough to sink to the bottom during sedimentation.
3. Sedimentation—Heavy particles settle to the bottom and the clear water moves to filtration.
4. Filtration—Water passes through filters, some made of layers of sand, gravel, and charcoal that help remove even smaller particles.
5. Disinfection—A small amount of chlorine is added or some other disinfection method is used to kill any bacteria or micro-organisms that may be in the water.

Water Storage and Delivery

After the water is treated, there must be a way to deliver it to each residence or business. If you live in a city, water is often pumped through underground pipes to water users.

In a small town, water is often pumped to an enclosed, above-ground storage tank. When needed, the water flows due to the force of gravity through underground pipes to each residence or business.

Water Supply System

Sample Research Questions

Questions about the water source

- What is the water source? (For example, does it come from a human-made reservoir, a lake, or a river, or is it groundwater?)
- What is the name of the water source?
- How far is the water source from the community?
- How is the water piped from its source to the community? (For example, does it move through above-ground canals, aqueducts, or pipes or through underground pipes?)

Questions about treating the water

- Where is the water supply treatment plant located?
- Are filters used to treat the water?
- Are chemicals used to treat the water?
- How many steps does it take to clean the water before use?
- How long does it take to treat the water?
- How much water can be treated each day?
- How do they check to make sure the water is clean? Do they do tests? If so, what kind of tests?
- What types of pollutants are in the water before treatment?
- Are there any pollutants left in the water after treatment? If so, what types are there?

Questions about delivering the water

- How many people rely on the water supply system?
- How much water is used each day by the community?
- How large are the pipes that deliver the water?
- What kinds of problems occur during water delivery?

Other questions about the water supply system

- How old is the water supply system?
- Who manages the system?
- Is there more than one water supply system for the community?

Wastewater System

The following contains general information about how communities treat their wastewater. You can use this information in your classroom in the event that you are unable to schedule a field trip to a facility or agency responsible for your county, city, or town's wastewater or can't arrange for an expert visitor.

Teacher Notes: To find information about wastewater resources administered by your specific county, city, or town, use your web browser to search for the name of your county, city, or town, followed by the words "public utilities," "public works," or "wastewater." (For example, if you live in Phoenix, AZ, you would type "Phoenix public utilities," "Phoenix public works," or "Phoenix wastewater.")

If you don't have access to the Internet, look in your local phone book under public utilities, public works, or the wastewater department and call the local office for information.

Although each treatment plant in each community varies, and the names for each step in the process may be different, the following are some of the typical steps used to treat wastewater:

1. Wastewater arrival—Water is pumped via large pipes (up to four or more meters in diameter in large cities) to the water treatment plant.
2. Preliminary treatment—Wastewater flows through filters that remove large objects such as toilet paper.
3. Primary treatment—Wastewater flows to large settling tanks, where the flow is slowed down so material that is suspended in the water can sink to the bottom of the tanks. At this stage in the process, the treated liquid is often called effluent.
4. Secondary treatment—Aerobic bacteria are often used to digest the organic material that has not settled out of the effluent and is dissolved within it. After digestion, the effluent and bacteria flow to tanks where the bacteria and other fine material are allowed to settle out.
5. Disinfection and discharge—The effluent is disinfected using chlorine or some other disinfection process and is pumped to a nearby body of water or available land.

Wastewater System

Other Treatment Plant Activities

In some locations, the solids and liquids remaining during the treatment process are reused and recycled. The following are some of those uses:

- Biosolids—Some highly treated solids are used to build up depleted soils in agricultural or forestry areas.
- Reclaimed water—Some water, which has undergone additional treatment, can then be used for irrigation or for processes within the treatment plant. In some areas of the world, reclaimed water is even used for drinking.
- Methane—One of the by-products during the breakdown of organic waste is methane gas. In some plants, this gas is captured and used to generate power to operate the treatment plant.

Wastewater System

Sample Research Questions

Questions about piping the wastewater to the treatment plant

- How far is the treatment plant from the community?
- How many people rely on the wastewater system?
- How does the wastewater get from our households to the treatment plant?

Questions about treating the wastewater

- Where is the wastewater treatment plant located?
- Are filters used to treat the wastewater?
- Are chemicals used to treat the wastewater?
- How many steps does it take to clean the wastewater after use?
- How long does it take to treat the wastewater?
- How much wastewater can be treated each day?
- How do they check to make sure the wastewater is clean? Do they do tests? If so, what kind of tests?
- What types of pollutants are in the wastewater before treatment?
- Are there any pollutants left in the wastewater after treatment? If so, what types are there?

Questions about disposing of wastewater

- What happens to the wastewater after it's treated? (Is it released to the water cycle in a nearby body of water, used for crop irrigation, or is there another solution?)
- What kinds of problems occur during wastewater disposal?

Other questions about the wastewater system

- How old is the wastewater system?
- Who manages the system?
- Is there more than one wastewater system for the community?

“Top 5” Lists

Directions:

Work with your group to create the “Top 5” lists described below. Use your “Tracking Water Use” sheets to help you decide what to put on your lists.

Top 5 Most Important Water Needs

1.

2.

3.

4.

5.

Top 5 Things You Do That Use the Most Water

(These can be wants or needs.)

1.

2.

3.

4.

5.

Home Water Use

The table below shows estimates of how much water is used for a number of common household activities. The estimates are based on data collected by scientists who study people's water use behavior.

Activity	Estimated Water Use
Drinking water	1 liter per person per day
Flushing a toilet	15 liters per flush (older model)
	6 liters per flush (newer model)
Taking a shower	20 liters per minute
Taking a bath	120 liters
Washing dishes in a dishwasher	80 liters per load (older model)
	30 liters per load (newer model)
Washing clothes	120 liters per load (older model)
	80 liters per load (newer, front loading model)
Washing a car	100 liters
Watering a lawn	900 liters each 30 minutes for an average sized lawn

Sources: U.S. Department of the Interior, U.S. Geological Survey, Denver Water Department, Colorado River Water Conservation District

How Much Water Do We Use at Home?

Below are the calculations and responses for the questions on pages 37–39 of the science notebook that accompany Session 2 of Lesson 11.

Drinking:

1. How much water would a family of four drink in a day?

   4 people × 1 liter = 4 liters

In the bathroom:

2. A family of four has an older toilet. If each member of the family uses the toilet four times a day, how much water would the entire household use in a day?

   4 people × 4 flushes × 15 liters = 240 liters

3. A family of four has a new toilet. If each member of the family uses the toilet four times a day, how much water would the entire household use in a day?

   4 people × 4 flushes × 6 liters = 96 liters

4. If you took a five minute shower, how much water would you use?

   5 minutes × 20 liters per minute = 100 liters

5. If you took a ten minute shower, how much water would you use?

   10 minutes × 20 liters per minute = 200 liters

6. If you took a bath, how much water would you use? 120 liters

Washing dishes:

7. If a family washed a full load of dishes in an older dishwasher, how much water would they use?

   1 load × 80 liters = 80 liters

How Much Water Do We Use at Home?

8. Would the amount of water used be different if they washed a half load of dishes?

   No, since the dishwasher cannot detect load size.

9. Why does it save water if you wash a full load of dishes?

   Over time, you will need to run fewer total loads.

10. How much water would they use if they washed a full load in a new dishwasher?

    1 load × 30 liters = 30 liters

Washing clothes:

11. How much water would they use if they washed a full load of clothes…

    …in an older washer? 120 liters

    …in a newer (front loading) washer? 80 liters

12. Why do some washing machines have settings that let you select different sized loads?

    These settings allow you to set the amount of water that will be used so that you can use less water for small loads than for large loads.

In the yard:

13. How many gallons of water would you use to water an average size lawn for one hour?

    900 liters per half hour × 2 = 1800 liters

14. How many five minute showers could you take with the same amount of water?

    Hint: Divide the total from question 13 by the number of liters you calculated in the answer for question 4.

    1800 liters used to water the lawn for an hour ÷ 100 liters used for a five minute shower = 18 showers

Which Family Uses Less Water?

Below are the answers for the table on page 42 of the science notebook that accompanies Session 3 of Lesson 11.

Activity	Garcia Family	Knox Family
Drinking water	35 liters per week	35 liters per week
Flushing the toilet	840 liters per week	2100 liters per week
Taking showers	3000 liters per week	7000 liters per week
Taking baths	2400 liters per week	240 liters per week
Washing dishes	150 liters per week	560 liters per week
Washing clothes	480 liters per week	1200 liters per week
Washing the car(s)	100 liters per week	200 liters per week
Watering the lawn or yard	100 liters per week	1800 liters per week
Total	7,105 liters per week	13,135 liters per week

Pollution Types and Locations

The types and locations of pollution you and the students will be able to identify on the Pollution Walk depend on several factors. Some of these include the location of your school (suburban, urban, or rural), how frequently the school grounds or local streets are cleaned, how long since the last major rainfall (rain may wash pollutants away), and your local climate (students in snowy climates may notice salt on the street or have difficulty spotting pollution on the ground).

The following table lists some types of pollutants you might find, as well as suggestions about where to look.

Type of Pollutant	Possible Location
Paper (cups, bags, sheets)	Ditches and drains. On the side of streets around the school.
Plastic (bags, bottles, soda pop holders, straws, juice boxes)	All around the school. Particularly on side of streets.
Glass (broken glass, bottles, jars)	Near storm drains. On the side of streets around the school.
Cigarette butts	All around the school. Particularly on side of streets.
Electronic waste (batteries, light bulbs)	All around the school. Particularly on side of streets.
Automobile waste (oil and gasoline leaks)	Underneath cars or buses in school parking lot.
School debris (paint chips, rust from drain pipes)	Near school buildings and drains.
Lawn care products (pesticides, herbicides, chemical fertilizers)	Speak with school custodian to find what, if any, are used.
Industrial waste	Not likely unless your school is situated near an industrial facility.

Examining Project Vignettes

Protecting Water Resources Project

Vignette	Issue	Guiding Question	Investigation	Action	Communication
Protecting a River	A local river is polluted.	How can we remind people that the river needs to be protected from pollution?	Contact the local water department.	Draft language for a sign posted on a bridge over the river.	Picture of the new sign and the thank you letter from the water department officials.
The Wetlands Gazette	Local wetlands are polluted by garbage.	How can we make people aware that the wetlands are important and should not be polluted?	Visit the wetlands and analyze the trash.	Write and publish a short newspaper to make people aware of wetlands and pollution issues.	Same as the action taken.
A Compromise for the Beavers	Beavers are to be relocated because their dams flood a road.	How can we help save the beavers and the pond they created?	Contact an animal protection group.	Alert the animal protection group, assist in building and installing the "beaver bafflers."	Photograph the project and share at a class meeting.
Water Awareness Day	Other students at school are not learning how to protect water resources.	How can we share with the entire school community what we learned about protecting water resources?	Students use information learned throughout the Watery Earth unit, without further investigations.	Create exhibits and posters, give tours, read stories and teach songs to younger students.	Same as the action taken.
School Cleanup Day	Students notice lots of trash during their pollution walk.	How can we reduce the pollution we noticed?	Though students focus on what they learned in the unit, they also meet with teachers and the principal.	Organize a school clean-up day and fundraiser.	Involve the entire school in the cleanup and write an article for the school newsletter.

Effective Guiding Questions

Protecting Water Resources Project

Effective **guiding questions** exhibit the following traits:

Doable

- Students can realistically investigate the question.
- Materials for learning more about the question are available.
- The question is appropriate for this age group.

Worthwhile

- The question relates to something that scientists or other professionals have to deal with.
- The question deals with a topic students learned or wondered about during the Watery Earth unit.
- The question helps students make connections between different science concepts.
- The question is complex enough to be broken down into simpler questions.

Contextual

- The question is based on a real world problem or issue.
- The question has real world consequences in students' lives.

Meaningful

- The question is interesting and important to students.
- The question causes students to think about their lives and their place in the local community or world.
- New understandings students gain while investigating the question will interest them.

Sustainable

- The question encourages students to investigate, observe carefully, and find solutions over time.
- Students can explore a variety of answers in great detail.

Adapted from *Teaching Children Science: A Project-Based Approach* by Joseph Krajcik, et al. (Boston: McGraw-Hill College, 1999).

Name: _____ **Date:** _____

Reporting My Progress

Protecting Water Resources Project

Complete the questions on this sheet. Your teacher will either collect the sheet or ask you to keep it as a record of your progress.

1. I have been working on these tasks:

_____

_____

2. I was challenged by:

_____

_____

3. I solved this challenge by:

_____

_____

4. The next tasks I will work on are:

_____

_____

_____

_____

5. These tasks are important to the **guiding question** because:

_____

_____

Name: _____ **Date:** _____

Revising My Draft

Protecting Water Resources Project

Find a person to read your draft, and then meet with that person to discuss their ideas about how you can improve your draft. Record notes from the meeting below.

1. _____ read my draft and we discussed it.

2. Things my reviewer liked and understood:

_____

_____

_____

_____

3. Things my reviewer suggested that I change:

_____

_____

_____

_____

4. In order to make those changes, I will need to:

_____

_____

_____

_____

Dear Families,

Throughout the Watery Earth Unit, your child has learned that water on Earth is abundant but that we must protect it because there is a limited amount of fresh, clean water available. Now it's time for your student to apply their knowledge of water by participating in a culminating project.

The project's purpose is to prompt students to take an action that protects water resources. Students may focus their efforts on conserving water resources, or on preventing or reducing water pollution. Whatever direction they take, the Protecting Water Resources project lets them share their learning with an audience, experience the satisfaction of becoming well informed, and contribute to an issue they care about.

During the project, I'm inviting you to participate in the following ways:

- Discuss the issues your child would like to learn more about or impact in some way.
- Help your child locate resources for learning more about their project.
- Read resources with your child and explain any challenging material.
- Help your child find people who are experts on the subject matter.
- Inquire about the project activities every now and then.
- Offer suggestions for tackling any project challenges.
- Go over your child's written work and provide supportive feedback.
- Visit the classroom during project work sessions.
- Attend your child's project presentation.

Your interest and support is the key to making your child's experience positive. A positive learning experience results in thoughtful action and positive change.

Sincerely,

Name: _____ **Date:** _____

Evaporation Data—Observations 1

In this investigation you observe and measure water that evaporates out of containers placed in different locations in the classroom.

First set of observations

Today's Date: _____

Time of Day: _____

1. Draw or describe the type of container you are going to pour the water into:

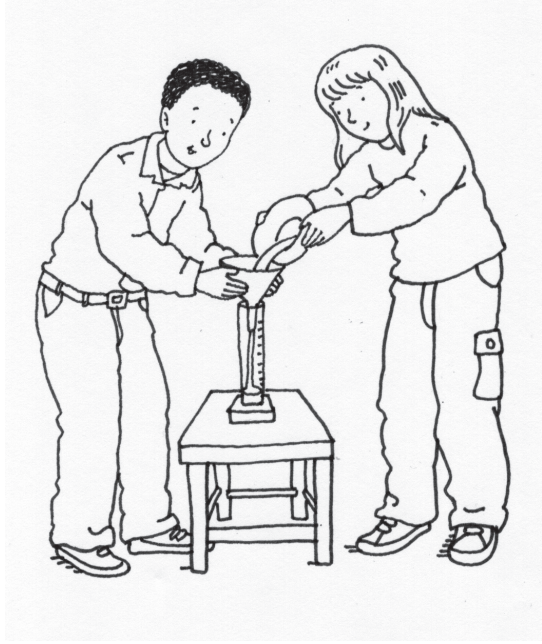
2. Put 100 ml of water in the graduated cylinder and carefully pour it into the container.
3. Find a spot to place the container where it will be undisturbed for the next few days.
4. Draw or describe where you placed the container:

5. Predict how much water will evaporate in three days: _____ ml

Name: _____ **Date:** _____

Evaporation Data—Observations 2

Second set of observations



Today's Date: _____

Time of Day: _____

1. Gather the container of water.
2. Hold the spout of the funnel over the top of the graduated cylinder and have another person carefully pour the water from the container into the graduated cylinder.
3. How much water was left in the container?

   _____ml
4. How much water evaporated? (Hint: Subtract the amount of water left from the amount of water you started with.)

   _____ml
5. How many hours did it take for that much water to evaporate? (Hint: Count the number of hours between the time you set up the evaporation samples to the time it is right now.)

   _____
6. How close was your prediction about how much water would evaporate?

7. Describe any conditions you think might have affected how the water in your container evaporated:

Name: _____ **Date:** _____

Condensation on Containers

Figure out where condensation on containers might come from.

1. What is on the outside of the room-temperature container? Describe what you see:

2. What is on the outside of the cold container? Describe what you see:

3. Use a paper towel to wipe the outside of the cold container. What is on it, and where do you think it came from?

4. Use a paper towel to wipe the outside of the cold container holding colored water. What is on it, and where do you think it came from?

5. If you have time, draw a comparison of the room-temperature container and the cold container.

Name: _____ **Date:** _____

Family Link with Science—Homework

Tracking Water Use

Your child is studying water in science class. During our next lesson, we will talk about the many ways that humans use water. To assist with that lesson, please help your child complete this sheet as thoroughly as possible.

Keep track of **all** of the ways that you use water during a 24-hour period and list them in the categories below.

Category 1: Drinking and Eating

Category 2: Keeping Clean

Category 3: Caring for Pets

Category 4: Playing

Category 5: Other

Please return to class by _____.

Name: _____ **Date:** _____

Family Link with Science

Container Request

Our class can use your empty, plastic, 1-gallon and 1-liter containers. We will use them in a science lesson. Please send in rinsed containers with lids.

Thank you!

Name: _____ **Date:** _____

Family Link with Science

Container Request

Our class can use your empty, plastic, 1-gallon and 1-liter containers. We will use them in a science lesson. Please send in rinsed containers with lids.

Thank you!

Name: _____ **Date:** _____

Family Link with Science—Homework

Observing Rain at Home

As part of the Watery Earth Unit, we did an activity in class in which the students shared their understanding of what happens to a drop of rain after it falls. In this activity, help your child observe and record what happens when rain falls near your home. Have them look at a number of different surfaces including some that readily absorb water and some that don't. If it is not raining, have your child drip water from a straw or eyedropper in various locations.

On a rainy day, take a walk around your home or neighborhood with a family member. Notice where the rain lands. What happens to the rain when it lands on different surfaces? Where does it flow next? Does it collect in certain places?

Use the following chart to record a few of your observations:

Where is the rain falling?	**What does the rain do on that surface?**	**Where does it go next?**

Name: _____ **Date:** _____

Family Link with Science—Homework

Observing Rain at Home

Where is the rain falling?	What does the rain do on that surface?	Where does it go next?

Please return to class by _____.

Name: _____ **Date:** _____

Family Link with Science—Home Activity

Wondering About Wells

Today your child learned that many people get their drinking water from underground sources. If your family's tap water comes from a groundwater well, help your child answer the following questions based on your own household. If your family does not get its water from a well, help your child find someone who uses a well who they can interview using the following questions. Think about friends and relatives who live in other towns or regions of the country—especially those who don't live near a body of surface water.

Try to find someone who gets their home drinking water from a well. Talk to them about the following questions. Make notes about their answers underneath each question, or on a separate sheet of paper. If the person you are talking to doesn't know the answer to any of the questions, make note of that, too.

- Where is your well? Do you know how deep it is?
- Do you have any idea how it works? If so, how would you explain it? (How does the water get from the well to the faucet?)
- Has your well ever had to be repaired or re-drilled?
- Do you ever have your well checked or cleaned?
- Do you ever have your water tested?
- Do you try to limit use of pollutants that might enter your groundwater and your well? If so, how?
- Can you taste a difference between the water from your well and other water you've drunk (for example, bottled water or tap water that isn't supplied by a well)?

This activity is optional.

Name: _____ **Date:** _____

Family Link with Science

Empty Bottles

Our class can use your empty, clear plastic, 2-liter bottles. We will be using them in one of our science lessons. Please send in rinsed bottles with their labels removed.

Thank you!

Name: _____ **Date:** _____

Family Link with Science

Empty Bottles

Our class can use your empty, clear plastic, 2-liter bottles. We will be using them in one of our science lessons. Please send in rinsed bottles with their labels removed.

Thank you!

Family Link: Empty Bottles (Lesson 7) Watery Earth Teacher Master 32

Name: _____ **Date:** _____

Family Link with Science—Homework

Household Water System

Answer the following questions about your household water system by talking with family members. If you are unsure about any of the answers, please make sure to note that in your answer.

1. Where does your water come from? (for example, do you have a well, do you get your water from a city water system, other, not sure)

2. Does your family do anything to treat your water before drinking it? (for example, do you use a water filter, do you buy bottled water, other)

3. What happens to the water after use? (for example, do you have a septic system, does it go into the city water system through pipes, other, not sure)

Please return to class by _____.

Name: _____ **Date:** _____

Family Link with Science—Homework

Brushing Teeth: How Much Water Do You Use?

Your child needs to collect data for science class about how much water they use to brush and rinse their teeth. They may need your help selecting a measuring tool, and then implementing their plan to collect and measure the water.

Collect and measure the water you use during one tooth-brushing session. Don't change the way you brush or rinse your teeth. Just make sure you save all the water you use so you can measure and record the data to share with your class.

1. Guess how many cups of water you use to brush and rinse your teeth.

   _____ cups

2. Think about the challenges of measuring the water you use to brush and rinse your teeth and decide how to solve them.
   - How will you collect the water?
   - What will you use to measure the water?

3. Brush and rinse your teeth. Collect and measure all of the water. Use U.S. customary units (cups) to record your data, and round off to the nearest cup.

   _____ cups

4. Think about each step you followed to brush and rinse your teeth and list them on the back of this sheet.

5. Also on the back of this sheet, describe any problems you had collecting or measuring the water.

Please return to class by _____.

Name: _____ **Date:** _____

Family Link with Science—Homework

Calculating Flow Rate

Your child has been looking at data about water use in science class. Now they need to collect data about how much water comes out from one or more plumbing fixtures in a given time period (the flow rate). They may need your help selecting a measuring tool, and then timing, collecting, and measuring the water. Choose a fixture that has enough space to hold a bucket or garbage can under it.

Materials:

- Bucket or other large container
- Measuring cup or other measuring tool
- Stopwatch or watch with a second hand

Procedure:

1. Select a plumbing fixture (for example, a faucet, shower, or outside hose).
2. Get the bucket or other container ready to collect all the water that will flow for one minute. You may need more than one container, depending on how fast the water flows. Don't put the container under the water until after the faucet is turned all the way on full.
3. Get ready to time how much water comes out in one minute. Start the stopwatch or look at where the second hand on the watch is.
4. Turn the water all the way on and quickly put the container under the faucet to collect the water.
5. Leave the water all the way on for one minute and then remove the container and turn off the faucet.
6. Measure the water in the container. Round off the amount to the nearest gallon. The amount that you collected is the flow rate in gallons per minute.

Note: Different plumbing fixtures may have different flow rates. Showers and bathtub faucets will have different flow rates than a sink faucet or a different shower or bathtub.

Think: What happens if you turn down the flow rate of the faucet when you do things like rinse your toothbrush or wash your hands?

This activity is optional.

Name: _____ **Date:** _____

Family Link with Science—Homework

Water Pollution

Think about what you already know about water pollution and then answer these questions to the best of your ability. If you're having trouble, you may consult with your family, but please don't use any other sources of information, such as the Internet or books.

1. What is water pollution?

2. Give one example of how water pollution can affect the environment.

Please return to class by _____.

Name: _____ **Date:** _____

Family Link with Science—Home Activity

Neighborhood Pollution Walk

Directions: As you walk around your neighborhood, look for different types of pollution and record the following in the table below:

1. In the first column, circle the type (or types) of pollutant that you found.
2. In the second column, describe the pollutant.
3. In the third column, record the pollutant location.

Pollutant Type	Description	Location
Paper Plastic Glass Metal Automobile Lawn Care Electronic Other _____		
Paper Plastic Glass Metal Automobile Lawn Care Electronic Other _____		
Paper Plastic Glass Metal Automobile Lawn Care Electronic Other _____		

Name: _____ **Date:** _____

Family Link with Science—Home Activity

Pollutant Type	Description	Location
Paper Plastic Glass Metal Automobile Lawn Care Electronic Other _____		
Paper Plastic Glass Metal Automobile Lawn Care Electronic Other _____		
Paper Plastic Glass Metal Automobile Lawn Care Electronic Other _____		

Do you think your neighborhood water is at risk? Why or why not?

This activity is optional.

Name: _____ **Date:** _____

Family Link with Science—Homework

Investigating My Issue

Your child needs to think about and list the information sources that will help them learn more about the issue they will try to impact through their Protecting Water Resources project.

Think about all the possible places you might find information that will help you learn more about your issue. Talk to your partner(s), teacher, librarian, and family members about your issue.

Record all the people and places that might provide more information:

_____

_____

_____

_____

_____

_____

_____

_____

Note: You probably won't have time to check all these resources, but having a large list of choices will help you make a plan. It will also help your teacher, school librarian, and family members guide you in your search for information.

After you begin investigating these resources, you might think of new ideas about where to find information. Record those ideas here:

_____

_____

Please return to class by _____.

Name: _____ **Date:** _____

Family Link with Science—Home Activity

Evaporation in My Home

As part of the Watery Earth Unit, your child is studying evaporation. This activity helps your child observe evaporation in different areas of your home and think about what affects evaporation in those areas.

1. With a family member, identify some locations around your home where you can leave a cup of water uncovered and undisturbed for at least one week. (Make sure it is in a location where a house pet cannot drink it.)
2. Gather clear plastic cups (all the same size and shape) for each location you identified and fill each one with 1 cup of water.
3. Mark the level of the water on each cup with a permanent marker or a piece of masking tape.
4. Place the cups in the different locations around your home.
5. Check the cups after a week and answer the questions below.

Questions:

1. Where in your home did the most water evaporate? Why do you think more water evaporated in that spot?

2. Where in your home did the least amount of water evaporate? Why do you think less water evaporated in that spot?

This activity is optional.