



We All Use Water

Are you a direct or indirect water user? Or both?

GRADE LEVEL

- 3-6

SUBJECT AREAS

- Social Studies, Environmental Science, Ecology

SKILLS

- Analyze, Interpret, Apply, Technology

VOCABULARY

Agriculture, earth systems, energy, direct, fish and wildlife, hydroelectric power plant, indirect, industry, irrigation, mining, navigation, obvious, precipitation, produce, urban, utensils, recreation, storm drain, water manager

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- Additional Educator Resources

MEASURABLE OBJECTIVES

The learner will:

- Explain the difference between direct and indirect water use.
- Identify ways that he/she uses water directly and indirectly.
- Recognize that he/she is connected to other water users as a consumer of products.

BACKGROUND AND TEXT OVERVIEW

INTRODUCTION

We each use water every day. Farmers use water to grow the food we eat. Power plants use water to make electricity to light our homes and run our TV sets and computers. Water companies clean water so we can safely drink it. Every day, somewhere, kids are swimming, fishing and boating with their families, or maybe skiing or ice skating.

Some uses of water are direct, such as when a farmer waters his or her plants to grow food or when people wash, bathe or cook. Indirect water uses are not immediately obvious. For example, a person indirectly uses water when driving a car or riding a bike, because water was used in the production of steel and other parts of the vehicle or bike.

WE ALL USE WATER—WATER IS A SHARED RESOURCE

We each use water every day and we are all water users. Water sources cross borders created by people. No matter the role or roles we play, we all share the same water.

DIRECT AND INDIRECT WATER USE

Some uses of water are direct, such as when a farmer applies water to crops to grow food or when individuals wash, bathe or cook. Indirect water uses are

not immediately obvious. For example, a person indirectly uses water when driving a car or riding a bike, because water was used in the production of steel and other parts of the vehicle or bike.

WATER USER GROUPS

There are a variety of ways to categorize water users, we will use: industry, earth systems, energy production, fish and wildlife, navigation, recreation, agriculture and urban. Water is critical for all water users and water user groups use water in different ways.

WATER MANAGEMENT

Water managers manage our water supply. They measure snowpack in the mountains and rainfall each year to predict the amount of water available. They monitor the amount of water held in reservoirs and aquifers and try to balance the needs of

all water users. With a limited water supply and a growing population, water managers will continue to promote water conservation so that there will be enough to go around. Water managers can't manage a water resource well until they know who water users are, what they need and how to collectively deal with common water management challenges (e.g., flooding, drought, pollution, endangered species, population growth, etc.). These challenges affect us all, and any decisions made to solve a water dilemma must consider all water users.

THE 4 R's

A shared goal of water managers is to meet the water needs of individuals and groups whenever possible. This goal presents a major challenge. To satisfy the water needs of any water user, the 4 Rs of water management must be considered. The 4 Rs are

a water user's need to receive water at the **right amount**, the **right cost**, the **right time** and of the **right quality**. With eight water users sharing the same resource, communication and cooperation are essential. People, plants, animals, businesses and ecosystems depend on it.

The **right amount** means enough water to sustain life or to make a product. Animals need water on a daily basis, and all animals need water to survive. Navigation requires enough water in a waterway to support boat traffic. Recreationists need enough water to boat, swim, ski, golf or fish. Agricultural water needs vary according to region and crop. Manufacturers of goods from paper to power require water for production. In the United States, the average household uses 350 gallons of water per day. Although the quantity needed by each water

Water User Group	Examples of Users	Use of Water
Fish/Wildlife	Wildlife refuges, fisheries	Water for habitat and to drink
Recreation	Resorts, parks, campgrounds, fishing, water recreation (summer and winter), bird watching	Water for recreational activities
Energy	Dams (hydroelectric power), steam powered turbines	Water power produces energy for electricity
Earth Systems	Rainfall, glaciers, wetlands and forests	Water is stored in, moved and used by earth systems
Industry	Manufacturing of products, factories, mining of metals and other resources	Water is used as an ingredient to produce various products, water is also used in the manufacturing process
Urban	Cities, towns and individual homes	Water provided to homes, water used for cleaning and irrigation of city lands
Agriculture	Farming, ranching, food processing, forestry (including paper, lumber and Christmas trees)	Irrigation, water for stock to drink
Navigation	Ports and barges	Water necessary for boats to float

user may vary greatly, none of them can go without it.

The **right cost** means that must be affordable for its intended use. For example, a marina constructs a dock for recreational boaters. If the river or reservoir level drops significantly, the marina may have to spend money to lengthen or move the dock. These costs could be passed on to the boaters. For an industry, the cost may involve the price of installing elaborate purification methods to collect, treat, use and return water back to the river. For animals, the cost might be the energy used to migrate to a new watering hole. For a plant, it could mean the energy costs of closing down the stomata to prevent evaporative water loss. This in turn would slow photosynthesis and growth. All water users have some cost associated with the water they use, both directly and indirectly.

The **right time** means water must be available when it is needed. People generally consume water based on thirst, and their bodies are unable to store excess water for use later. People can become dehydrated in just a few hours. Many birds depend on wetlands at specific times of the year for nesting or migration. Salmon and trout need water in rivers for seasonal migration and spawning. Energy producers require a steady availability of water to rotate turbines and cool motors. Even a small seed demands the right amount of water at the right time: enough to germinate and not so much that it is washed away.

The **right quality** of water means clean enough for its intended

purpose. Navigation requires an unobstructed river channel clear of large debris. Energy producers can often make use of water other users can't, sometimes using recycled water from other users. One example of recycled water use is the use of treated wastewater to water golf courses and parks. Humans need drinking water that is free of bacteria, viruses and toxins. Plants and animals cannot build purification facilities—they must rely on natural processes to clean the water and use that which is available in their environment. Water quality includes physical, chemical and biological aspects.

WATER FOR ALL

We are all water users and we are very dependent on the services or amenities that other water users provide. There is great variety and interconnectedness of water users. Cooperation and compromise are necessary to manage a single water resource for the good of all.

ACTIVITIES

WATER USE ACTIVITY

Please see student copy page.

WATER USE ACTIVITY ANSWER KEY

Answers will vary by student but will be similar to the online activity.

TAKE ACTION!

ITEMS

- 1.I will help keep open spaces clean by collecting trash along trails and in parks.
- 2.I will keep a

pitcher of drinking water in the refrigerator instead of running the tap water until it gets cold to help save water.

- 3.I will put my garbage in the trashcan or compost pile instead of down the sink's garbage disposal to save water.

ACTIVITIES

ASSESSMENTS

PRETEST/POSTTEST

Before students visit the *We All Use Water Unit* of the *Discover Water* website, have them take the following quiz to see what they already know about water use. Have students take the same quiz again as a posttest to measure learning.

PRETEST/POSTTEST ANSWER KEY

- 1.True
- 2.True
- 3.All of the above
- 4.True
- 5.True
- 6.True
- 7.All of the above



CRITICAL THINKING QUESTIONS

LEVEL 1

Explain how eating strawberries uses water.

Answers should include the idea that it takes water to grow strawberries.

LEVEL 2

Are you a direct or indirect water user? Or both?

Answers should address the idea that anyone who uses just about any product or eats any food is both a direct and indirect water user, because water is involved in the production of most products and food.

LEVEL 3

Explain how turning on a light could use water.

Answers should include discussion of water being used to create electricity, such as through hydroelectric power production.

WHAT DID I LEARN? ONLINE QUIZ ANSWER KEY

Q. It took water to produce the cereal you ate this morning for breakfast.

A. True

Q. It took water to make the bike you ride.

A. True

Q. The eight water users groups include: fish/wildlife, recreation, energy, earth systems, industry, urban, agriculture and navigation.

A. True

Q. You are both a direct and indirect water user.

A. True

Q. You use water when you turn on a light bulb.

A. True

EXTENSIONS

Ideas for ways to support and expand lesson plans about this topic or provide additional activities for advanced learners.

- Visit <http://environment.nationalgeographic.com/environment/freshwater/water-footprint-calculator/> and calculate your water footprint—taking into account both direct and indirect use of water.
- Encourage students to search online for videos showing water being used in the production of various items they use daily.

RESOURCES

PROJECT WET RESOURCES

[Project WET KIDS \(Kids in Discovery Series\) Booklets](#)

- [Discover Ground Water and Springs](#)
- [Discover the Colorado River](#)
- [Discover the Hudson River](#)
- [Discover the Missouri River](#)
- [Discover the Red River](#)

- [Discover the Rio Grande](#)
- [Discover the Waters of Arizona](#)
- [Discover the Waters of Nebraska](#)
- [Discover the Waters of Nevada](#)
- [Discover the Waters of Tennessee](#)
- [Discovering Drought](#)
- [Explore Oceans](#)
- [Native Waters Sharing the Source](#)
- [The Water Story](#)
- [Water, Every Drop Counts](#)
- [Watershed Protection](#)

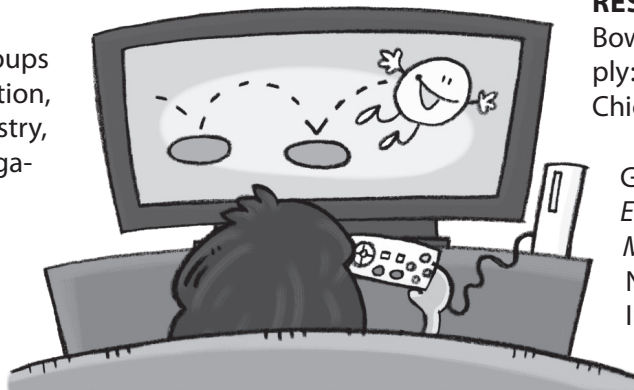
Project WET Curriculum and Activity Guide 2.0 Activities

- [8-4-1, One for All](#)
- [A Drop in the Bucket](#)
- [Common Water](#)
- [Money Down the Drain](#)
- [My Water Footprint](#)
- [Snow and Tell](#)
- [Storm Water](#)
- [Sum of the Parts](#)
- [Super Bowl Surge](#)
- [The Long Haul](#)
- [The Price is Right](#)
- [Virtual Water](#)
- [Water Audit](#)
- [Your Hydrologic Bank Account](#)

ADDITIONAL STUDENT RESOURCES

Bowden, Rob. 2003. *Water Supply: Our Impact on the Planet*. Chicago, IL: Heinemann Library.

Goodman, Donna L. 2003. *Every Drop Counts, Every Drop Matters*. New York, NY: United Nations Department of Public Information.



Vickers, Amy. 2001. *Handbook of Water Use and Conservation: Homes, Landscapes, Businesses, Industries, Farms*. Amherst, MA: WaterPlow Press.

ADDITIONAL EDUCATOR RESOURCES

Cronin, Amanda and David M. Ostergren. 2007. "Tribal Watershed Management: Culture, Science, Capacity, and Collaboration." *American Indian Quarterly*, 31 (1), 87-109.

Ferreira, Cecilia, Rob C. de Loe, and Reid D. Kreuzwiser. 2008. "Imagined Communities, Contested Watersheds: Challenges to Integrated Water Resources Management in Agricultural Areas." *Journal of Rural Studies*, 24 (3), 304-321.

Hall, Randy. 2008. "Science Sampler: Water-use Awareness." *Science Scope*, 31 (7), 62-66.

SciGuides. 2008. *Resources and Human Impact: Grades 5-8*. Arlington, VA: National Science Teachers Association.

U.S. Geological Survey. Estimated Use of Water in the United States in 2005. This website provides water use data down to the county level for the United States in 2005. <http://pubs.usgs.gov/circ/1344/>. Accessed May 19, 2011.



WATER USE ACTIVITY

Using the *We All Use Water Activity* online as a guide, record examples of your own direct and indirect water use to see how you are a water user and how many of the water user groups you connect. The water user groups are listed again here as a reminder.

Water User Groups

- Earth Systems
- Industry
- Navigation
- Energy
- Urban
- Agriculture
- Recreation
- Fish/Wildlife



My Day	Direct Water Use	Indirect Water Use/Water User Group
Wake Up	<i>Drink of water</i>	<i>Turn on light/Energy</i>
Breakfast		
Get ready		
Go to school		
Morning at school		
Lunch		
Afternoon at school		
After school		
Dinner		
Evening		
Bedtime		

We All Use Water Unit Pretest/Posttest

1. True or false, water sources can cross international borders.
2. True or false, a person can be both a direct and indirect water user.
3. An example of indirect water use is:
 - a. Water that helped the tree grow the apple for your lunch
 - b. Water is used in the process of manufacturing a product you use
 - c. Water is needed to float the boat you ride on
 - d. All of the above
4. True or false, Earth Systems can be called a water user group.
5. True or false, water managers have to balance the needs of many water user groups.
6. True or false, the right amount of water varies depending on the water user's needs.
7. Water managers need to take into consideration for each water user:
 - a. How much water they need
 - b. When they need water
 - c. The quality of the water they need.
 - d. All of the above

Score: ___/7

