



GRAB-AND-GO WATER ACTIVITIES

for Orange County K-12 students



WHAT'S INCLUDED

- ✓ Activity Background
- ✓ Learning Objectives
- ✓ Activity Procedure
- ✓ List of Materials
- ✓ Advanced Resources
- ✓ Engineering Design Process Worksheet
- ✓ Natural and Human Social Systems Venn Diagram
- ✓ Key Terms and Definitions

MAP YOUR WATER USE

Students engage in the steps of the engineering design process—Ask, Research, Imagine, Plan, Create, Test, Improve, Share—as they investigate and develop solutions to a real-world problem, and discover how everyday activities can significantly impact our water supply. Students will walk through their home or school, either alone or in groups, and think carefully about their access to water and how it is used. As they observe their surroundings, students will create a map that identifies places where water is used, and then begin to question what it takes for Orange County water providers to deliver a safe, clean, and reliable water supply to residents and businesses each day. Through evaluation of their water use map, students will identify opportunities to save water and test their methods for saving water. Students will be able to explain their process and findings to their peers or families.

Activity Background

From agriculture to manufacturing, water is a limited natural resource that is essential to the growth of California’s economy, the largest in the United States. Unfortunately, water isn’t always available where and when we need it. Roughly 75 percent of California’s water falls as rain and snow in the northern part of the state, but most of the people, farms, and industries reside in the southern part. Additionally, the amount of rainfall the state receives can fluctuate yearly. In an El Niño year, California receives heavy rainfall that produces an abundance of surface water. However, in drought years there is very little rainfall, so residents, businesses, and industry must rely on water stored in reservoirs or underground in aquifers. Because of these changes to our water supply, water industry professionals must find ways to balance water supply and demand and ensure the delivery of a reliable supply of water.

Here in Orange County, we live in a semi-arid climate, meaning “somewhat dry.” As our population grows, the demand for water also increases. As such, nearly half of Orange County’s total water supply is imported from hundreds of miles away. The water that comes out of our faucets has passed through an intricate maze of waterways, complex systems, and vital infrastructure that were designed, developed, and implemented to deliver a clean, safe, and reliable water supply.



Learning Objectives

After this activity, students should be able to:

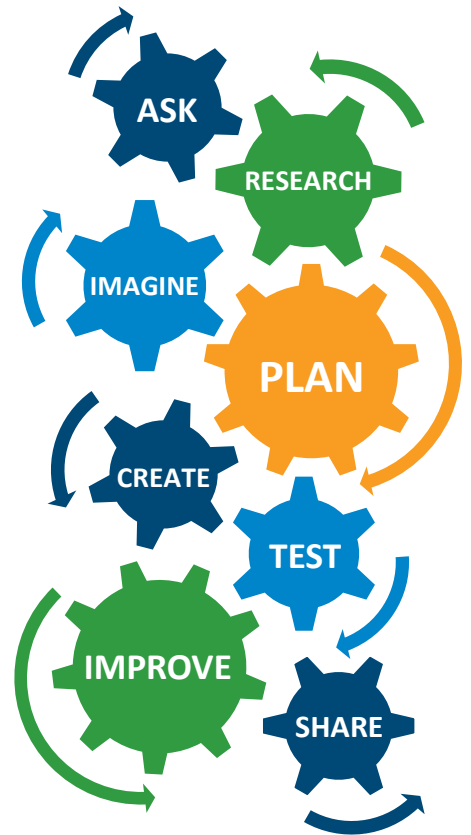
- Engage in investigation and evaluation to solve a real-world problem
- Observe where and how water is used both inside and outside of their home or school
- Explain the effects humans have on the quality, quantity, and availability of fresh drinking water
- Identify water saving opportunities as they map their home or school’s water use
- In a written summary or spoken presentation, describe the considerations involved in making decisions about Orange County’s water supplies

Making Your Water Use Map

In this activity, students will take a walk around their home or school campus to observe how humans interact with and impact the environment—specifically their relationship with water. The student’s map can be drawn on any scale as long as it highlights where and how water is used. The purpose is to get students to think about how they use water, identify challenges faced by water providers to deliver water including water quality, supply, and demand, and find solutions to ensure a reliable water supply for future generations. Be sure to discuss each map and engineering design worksheet, asking guiding questions to help students connect, reflect, and communicate the value of water and the role it plays in our everyday lives to their peers or families.

PROCEDURE:

- ◆ Make sure each student has the attached engineering design worksheet to complete the assignment.
- ◆ Using a blank sheet of paper, have students draw a base map of their home or school including individual indoor and outdoor areas/spaces such as bathrooms, kitchen, communal spaces, patios, gardens, and open spaces.
- ◆ Next, have students add elements of the surrounding community including streets, homes, businesses or commercial buildings, parks, etc.
- ◆ Once students have completed their base map, have them use a colored pencil, pen, or marker to mark the areas of their home or school where water is used. Students should also make note of how the water is used—washing hands, watering plants, drinking fountains, etc. **Tip:** Encourage students to think carefully about how they use water throughout the day.
- ◆ Using a different colored pencil, pen, or marker, have students mark where there is an opportunity to save water—shorter showers, plant climate appropriate plants, wash full loads of laundry, etc.
- ◆ Have students test their method for saving water over the course of a day, week, or month. Was their method successful? Why or why not? **Tip:** Direct students to research how much water their method saves by using the tools in the Advanced Resources section.



LIST OF MATERIALS

- ✓ At least 3 different colored pens, pencils, or markers
- ✓ Blank sheet of drawing paper
- ✓ Blank sheet of writing paper to take observation notes
- ✓ Engineering Design Worksheet

ADVANCED RESOURCES

- ✓ Southern California water supply: mwdh2o.com/your-water/how-we-get-our-water/
- ✓ Orange County water supply: MWDOC.com/your-water/
- ✓ Water use calculator: watercalculator.org



MAP YOUR WATER USE

Engineering Design Process Worksheet

NAME: _____

DATE: _____

ASK

When you turn on the faucet in the morning, where does your water come from? Who else is using the water besides you? How is the water used?

RESEARCH

Use books, technology, or human resources to research Orange County water supply and water use. Did you discover something new that you didn't know before?

IMAGINE

What challenges do you think Orange County water providers face in delivering safe, clean, and reliable water to you? Why is there a need for our water supply to be managed and distributed?

PLAN AND CREATE

Gather your materials, and draw a map of your home or school including each room and any outdoor spaces. On your map, identify where and how water is used.

TEST

Is there an opportunity to save water? If so, how? Test your water saving method and make notes on what worked, what didn't work, and why.

IMPROVE

What solutions might work better? Does understanding the challenges in delivering water make you think differently about how you use it?



MAP YOUR WATER USE

Natural Systems and Human Social Systems

NAME: _____

DATE: _____

System: When different parts or components connect to form a whole. Example: Pedals, handle bars, and wheels are different parts or components that connect to form a bicycle.

Natural Systems: Systems that occur in nature without any human influence like weather, rivers, or trees.

Human Social Systems: Systems that are created by humans like schools, freeways, parks, and government.

STEP 1

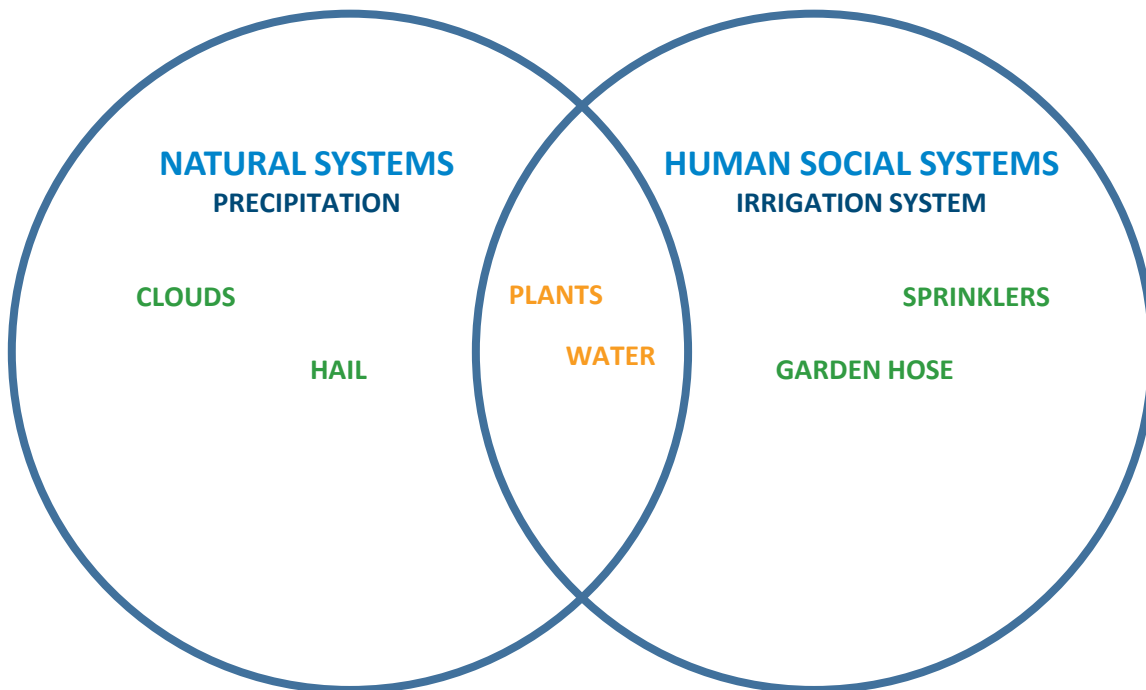
Explore your home, school, and neighborhood. Observe examples of natural systems and human social systems. Where do you find water? How is the water used? How does water get to this area? Why is water used or needed in this location? Are there different sources of water?

STEP 2

Precipitation is a natural system that is a phase of the water cycle. Precipitation comes in many forms like hail, and delivers water directly to Earth’s surface. What other natural systems do you see around your home or school? How has the environment impacted humans? You can expand on the example used below, or populate your own diagram with other examples.

STEP 3

Irrigation systems such as sprinklers is a human social system. They are built and connected to deliver water to the plants in your home or school. Take a walk around your home or school. What other human social systems do you see? How have humans impacted the environment? You can expand on the example used below, or populate your own diagram with other examples.



STEP 4

Through investigation, compare and contrast a human social system with a natural system. Where do they intersect? In the center of the two circles, make a list of the connections.

How have human activities caused changes to natural systems in your home or school?
Are there ways that you can help save water at home or at school?



MAP YOUR WATER USE

Key Terms and Definitions



- 01 El Niño:** An El Niño event occurs when the eastern Pacific Ocean is warmer than normal causing a shift in the circulation of the atmosphere. This change can produce intense rainfall and flooding in certain areas.
- 02 Infrastructure:** Systems or facilities that support human life such as water delivery and treatment, housing, schools, hospitals, freeways, and airports.
- 03 Irrigation:** The application of water to land and plants in designated amounts and at certain times to help them grow.
- 04 Natural Resource:** Materials or substances from nature that can be used by people, like air, plants, animals, soil, and water.
- 05 Precipitation:** Solid or liquid water forms in the atmosphere and falls back down to the Earth's surface as rain, snow, sleet, hail, etc.
- 06 Reliability:** Someone or something to be trusted or relied upon. You can trust that Orange County's water is clean and safe, and there is plenty of it.
- 07 Semi-Arid Climate:** "Somewhat dry." Here in Southern California we have warm, dry summers and mild, wet winters.
- 08 Surface Water:** Any body of water that is above ground such as streams, rivers, and lakes that is formed by the collection of precipitation and snow melt, called runoff. Surface water must be treated so that it is safe to drink.
- 09 Water Conservation:** The practice of using water more wisely to reduce unnecessary water use.
- 10 Water Provider:** Ensures a safe, clean, and reliable supply of drinking water is delivered to residents and businesses in the community.
- 11 Water Use:** How we use water every day. Direct water use is water that we use to drink, shower, wash our dishes and clothes, and water our plants. Indirect water use is water used to make everything we wear, buy, sell, and eat.