

Lesson 2: Connecting Humans' and Plants' Water Collection Strategies

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Grade Level(s)

First, Second, Third

Lesson Overview

Students will participate in either a whole-group or small-group shared “notice and care” activity in observing and collecting data about how water is stored or collected. This is the second in a sequence of three lessons.

Learning Objectives

Students will evaluate and critique the ways in which animals, plants, and humans collect and store water.

Standards

- NGSS 3-ESS3-1: Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.
- NGSS K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- NGSS 1-LS1-1: Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

Preparation

- Gather images of various ways that humans store water or collect water.
- Set out a few “reservoirs” to demonstrate what can happen to open bodies of water in sunlight. You may have students set these outdoors days before, letting them know they will be using the results at the end of the week.

Materials and Resources

- Pictures/videos of reservoirs
- Pictures/videos of dams (Tip: Look for historical images, like [this one](#), to emphasize how long humans have used them)
- Pictures/videos of underground dams
- Pictures/videos of water harvesting methods (such as rain water harvesting, roof harvesting, or toilet/shower water recycling)
- Information about three methods for collecting water: bag transpiration from leaves, creating an overnight still using leaves and a container, and creating a solar still
- Images of drought stricken areas
- Miniature versions of pictures
- Worksheets to collect students' "notice and care" information (see below)
- An intense light source
- Broad waxy leaves
- Soil pit (indoor or outdoor)
- Branches or sticks

Human Solutions and Plant Adaptations Chart

Human tool:	Way of collecting water:	Ways water escapes or isn't collected well:	Plant technique that might help:
Leaf overnight still	Collects water on the leaves	There are many holes where water can escape	Can make a shield that keeps the air from leaving, like wax
Reservoirs			

Activity 1: Human Collection/Recycling of Water "Notice and Care"

1. Review students' findings on the previous chart, plant adaptations to store or collect water.
2. Share with students that humans have been collecting and recycling water since humans have been on the planet. Since some areas of Earth are drier than others, some humans have water shortages, just like desert plants. They then must find ways to store, collect, and recycle water.
3. One of the most popular ways of storing water has been through reservoirs. Reservoirs are lakes, a collection of water with land all the way around. Let students know that many times, these don't form on their own where we need them, so humans have built dams to create artificial reservoirs.
 - a. Illustrate on a board (or with a photo) a dam acting as a barrier to form an artificial reservoir.
4. Share images of dams that were created many years ago.

Activity 2: Further Explorations

1. Currently, several regions in the U.S. are experiencing drought. Ask students to identify what a drought is from their experience. If they don't know it, define it for them.
2. Share that in some regions water is so unavailable that trees wither and die, including those that were intended to feed people.
3. Share that for this reason, just storing is not enough. Humans have had to come up with creative ways to collect and recycle water as well.
4. First introduce students to bag transpiration, followed by an overnight still using branches and trees, and a solar still. (This is meant to be an introduction to the items, rather than an in-depth exploration. Later on, the students will be exploring and making these items themselves.)
5. Have students self-arrange into groups if they are capable, or arrange them into groups of 3 or 4.
6. Share with students that they will have an opportunity to build prototypes of some of these tools to see how they work.
 - a. They will fill a small chart (see Resources) where they record what challenges these tools have in storing or collecting water.

Activity 3: Close

1. Students now work in their groups to identify something they noticed plants doing to keep water that they can use to improve one of these human water saving techniques.
2. Share with students that currently, people are coming up with other, even more interesting ways of collecting water. Share with them images and diagrams of rooftop water collection and of grey water recycling systems.
3. Let them know that next time you meet for this DT challenge, that they will get to see what a group of students did at a high school.

Assessment

Students will complete the worksheet table and have preliminary ideas about the relationship between human water needs and plants' water conservation methods.