Post-festival Lesson 6.3 My Water Footprint Lesson Plan

Investigative Question:

- How much water do I use daily?
- Why is water use called a water footprint?
- How can I be a better water steward?

Summary: Students learn what a water footprint is by constructing their own actual footprint, simulating water use and conservation through a group role play and identifying ways to conserve water through individual best practices.

Reference: Adapted from "My Water Footprint" Part 1, *Foundations of Water Education*, 2024, pg. 131-142.

Time Frame: 50 minutes

Cross Cutting Concepts Demonstrated:

- Cause and effect
- System & system models

Science and Engineering Practices Integrated:

- engage in argument from evidence
- obtain, evaluate and communicate information
- construct explanations and design solutions

Materials Needed:

- 2 sheets of $8^{1/2}$ x 11 paper per student
- Pencils and optional art supplies (markers, colored pencils, crayons)
- Scissors
- Cut out Copy page – Water Use Roles (enough for one per student)
- Teacher Lesson Resources pages
- Student Water Sustainability Worksheets

Warm up:

Use slides above to introduce lesson and review the difference between "**direct" and "indirect" water use**. Have them share several ways they use water every day. On average, how many gallons a day do you think a person in Arizona uses? 100-120 gallons a day!

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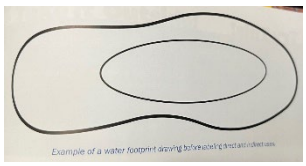
Lesson Sequence:

Activity – Part 1:



1. Pass out pieces of blank paper for students to **trace their own footprints**. The left foot and right foot should be traced on separate pieces of paper.
2. Inside each footprint, draw a medium to large oval (see example).
3. **Cut out footprints** and label them with the student's name on the back. **Collect the right footprints and save them for future use.**
4. Have students write down the **direct ways they use water inside the circle on their left footprint.** These will be the ways they directly touch or consumer water.
5. This is their "**water footprint**". Compare students' water footprints.
    a. **Does everyone have the same footprint?** No, everyone has their own unique footprint.
    b. **Would someone living in the desert use as much water** (or use water the same as) as someone living in the tropics? Hopefully not.
6. After students have completed writing the lists of items on their left footprints, collect all the footprints and display them, leaving room between them for the additions of the right footprint in the activity wrap up.

Activity – Part 2:

1. **Pass out Water Footprint Role** to each student from the Copy Page – Water Use Roles
2. Line up students at the end of a playing field, gym or classroom
3. Read the scenarios on the Resource page – Water Footprint Scenarios. **Students will move forward or backward depending on their role.**
4. After the game, distribute the **right footprints to your students and ask them to write ideas on their footprints for using less water** while still meeting their needs.
5. Pass out copies of the copy page- background reading or read this outload and discuss. **How do students think their water footprint compares to children in other countries?**

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Wrap-Up:

Continue to use slides to discuss the difference between **water conservation** and **water efficiency** and how we can use both to be water stewards.

- Discuss the population graph vs. water use graph and show that when we make good choices it does have an impact.
- Pass out water sustainability worksheets and have students work through them to demonstrate they understand water wise behaviors and sustainability actions.

*Students should complete the Lesson 6 section of their AWF Water Notes handout to record evidence and construct explanations based on that evidence. Students will also look at the lesson from the perspective of cause and effect – Cause is why something happened. Effect is what happened because of it.

Note to the Teacher:

In science, reasoning and argument based on evidence are essential in identifying the best explanation for a natural phenomenon. In engineering, reasoning and argument are needed to identify the best solution to a design problem. Student engagement in scientific argumentation is critical if students are to understand the culture in which scientists live, and how to apply science and engineering for the benefit of society. (from NSTA Science & Engineering Practices)

You can **wrap up the whole unit** by asking students to write a paragraph about or make a collage/poster to show:

- Where is Arizona's water
- connections they have discovered between people, water and heat in the environment (using evidence to support their argument/explanation).

Copy Page - Water Use Roles (page 1 of 2)

Create a Name:_____

- Lives in a house with old appliances
- Eats meat three times a day
- Is driven to school
- Buys new clothes
- Does not recycle
- Takes long showers (more than 10 minutes)

Create a Name:_____

- Lives in a house with old appliances
- Eats meat once a day
- Takes the bus to school
- Gets secondhand and new clothes
- Recycles at home
- Takes mid-length showers (5-10 minutes)

Create a Name:_____

- Lives in an apartment with new appliances
- Eats meat twice a day
- Takes the bus to school
- Buys new clothes
- Recycles at home and at school
- Takes long showers (more than 10 minutes)

Create a Name:_____

- Lives in an a camper with no appliances
- Does not eat meat
- Walks to school
- Goes to thrift stores for secondhand clothes
- Recycles at home and at school
- Takes short showers (less than 5 minutes)

Create a Name:_____

- Lives in an apartment with new appliances
- Eats meat three times a day
- Is driven to school
- Buys new clothes
- Does not recycle
- Takes long showers (more than 10 minutes)

Create a Name:_____

- Lives in a condo with new appliances
- Eats meat twice a day
- Rides a bike to school
- Buys new clothes
- Does not recycle
- Takes mid-length showers (5-10 minutes)

Create a Name:_____

- Lives in a house with new appliances
- Eats meat once a day
- Takes the bus to school
- Gets secondhand and new clothes
- Recycles at home
- Takes short showers (less than 5 minutes)

Create a Name:_____

- Lives in a condo with old appliances
- Eats meat three times a day
- Takes the bus to school
- Goes to thrift stores for secondhand clothes
- Does not recycle
- Takes long showers (more than 10 minutes)

Create a Name:_____

- Lives in a house with old appliances
- Does not eat meat
- Is driven to school
- Gets secondhand and new clothes
- Recycles at school
- Takes mid-length showers (5-10 minutes)

Create a Name:_____

- Lives in a house with new appliances
- Does not eat meat
- Rides a bike to school
- Goes to thrift stores for clothes
- Recycles at home and at school
- Takes short showers (less than 5 minutes)

Resource Page – Water Footprint Scenarios

1. **This morning you woke up and showered before coming to school.**
   a. 1 step forward if it was a short shower
   b. 2 steps forward if it was a mid-length shower
   c. 3 steps forward if it was a long shower
2. **You help out around the house by throwing a load of laundry in the washer.**
   a. 1 step backward if you have new appliances
   b. 1 step forward if you have old appliances
   c. Stay put if you use the laundromat (no appliances)
3. **You came to school this morning, excited to learn about your Water Footprint!**
   a. 1 step forward if you rode a bike
   b. 2 steps forward if you took the bus
   c. 3 steps forward if you were driven
4. **Time for lunch! The whole class went to the cafeteria to eat.**
   a. 1 step forward if you are a vegetarian
   b. 2 steps forward if you are a meat eater
5. **Your backpack feels a little messy, you decide to clean it out and get rid of old assignments.**
   a. 1 step forward if you recycle
   b. 2 steps forward if you don't recycle
6. **It's time to head home!**
   a. 1 step forward if you rode a bike
   b. 2 steps forward if you took the bus
   c. 3 steps forward if you were picked up and driven
   d. I step backward if you walked
7. **Your parents or guardian decided you needed some new clothes with winter coming up.**
   a. 1 step forward if you buy new clothes but also get some secondhand items
   b. 2 steps forward if you only buy new clothes
   c. 1 step backward if you go to the thrift store for secondhand clothes
8. **All of that shopping made you hungry, time for dinner.**
   a. 1 step forward if you are a vegetarian
   b. 1 step forward if you only eat meat once a day
   c. 2 steps forward if you eat meat twice or three times a day
9. **You help clean up after eating.**
   a. 1 step forward if you recycle at home
   b. 2 steps forward if you don't recycle at home

Copy Page – Background Reading

Think about all the ways you use water in a day—like brushing your teeth, flushing the toilet, and cooking. All of these activities use up a lot of water. Your **water footprint** is like an invisible mark that shows how much water you use for all of these things.

It's not just the water you directly touch, but also the water needed to make the things you use, like growing the food you eat or making the clothes you wear.

Your water footprint has two parts: **direct** (the water you use for things like bathing and drinking) and **indirect** (the water used by others that benefits you, like watering the food you eat or making the things you buy). Everyone has a different water footprint based on how they use water.

Our water footprint is the combination of direct use (like brushing our teeth) and indirect use (like using our phones).

Direct water use is easy to calculate based on your daily activities. The average person in the U.S. uses about 60-70 gallons (225-265 liters) of water indoors each day for washing, bathing, cooking, drinking, watering plants, and flushing the toilet. Indirect water use is harder to understand and calculate. Think about all the food we buy, the phones we use, the TVs we watch, and the cars, buses, and bikes we need. All of these things require water to make and use. When we add up all the gallons or liters or water we use for direct and indirect water use, we get our total water footprint. This number helps us understand how our actions can affect the amount of water available in the world.

Companies and schools also have their own water footprints. A company's water footprint includes all the water connected to a product—from growing to manufacturing to packaging.

For schools, the water footprint includes all the water students, teachers, and staff use for drinking, washing hands, flushing toilets, cooking, and cleaning. Indirect water use includes school supplies, furniture, computers, and the building itself.

Water footprints vary greatly around the world. Different countries and cultures have different ways of using water and therefore may have a different water footprint than yours or than the U.S.

Career Connections

PUBLIC UTILITIES MANAGER • WATER CONSERVATION SPECIALIST • LANDSCAPING/IRRIGATION SPECIALIST • WATER SMART APPLIANCES ENGINEER • WATER SUSTAINABILITY MANAGER FOR A BUSINESS • WATER RESOURCE MANAGER • ENVIRONMENTAL ENGINEER • WATER AUDITOR