



# How Big is Your Footprint?

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**Grade Level:**

Upper Elementary

**Subject Areas:**

Science, Social Studies,  
Mathematics, Language  
Arts

**SD Standards**

Science  
4.S.1.2

Math

4.G.2.1  
4.M.1.3

Social Studies

4.US.1.2

Language Arts

4.LVS.1.2  
4.L.1.1  
4.L.2.1  
4.S.2.1

**Setting:**

Classroom

**Skills:**

Recall, Observation,  
Calculation,

**Prior Preparation:**

Several books in this trunk provide good background information for this activity. These books include *One Well: The story of water on Earth*, *Environmental Footprints: How big is your footprint?* and *A Cool Drink of Water*.

**Objective:** Students will develop an awareness of their water footprint and its relationship to the amount of water on earth. They will gain an understanding of direct and indirect water use and be able to identify ways in which water can be conserved in order to reduce their water footprint.

**Materials:**

1 gallon jug (optional)

[List of usages](#) and how much water each takes - laminated

1 Poster of the World - laminated

1 Poster How Big is Your Water Footprint?

Excerpt (A Note on Water Conservation) from *A Cool Drink of Water* book

Food Coloring

Shaker of Salt

Beakers (1000mL, 100mL, and 10mL)

Eye Dropper

6 sets of game paddles (A & B)

Dry Erase Score Card and Marker Set

Set of water consumption cards (16 pairs) - laminated

[Water Footprint Calculation Worksheet](#) & [Answer Key](#)

**Background:**Water on Earth

Water is a limited resource, even though 71 percent of our planet is covered with it. Only a small amount of it is available for human consumption (meaning freshwater) - which is about 3 percent of the total. However, most of this 3 percent is frozen in ice caps and glaciers! In fact only 0.003 percent of the total water on earth is clean, fresh, unpolluted, and available for us to use. If potable water were distributed equally throughout the whole world this would actually be more than enough water for everyone to survive on. Unfortunately that is not the case. For most of us in the United States water is plentiful, but in some places around the world clean useable water is very scarce.

Human Water Use

Water is used for a variety of things in our everyday lives. You may be surprised of how much water it takes to provide all the things you use and eat every day. In our homes we use water for cooking, cleaning, and watering our gardens and lawns. Outside our homes water is used for watering crops, manufacturing goods, and to run power plants. All of these things use different amounts of water. The availability of water is an important factor in being able to do all of these things. That is why conserving water is very important. The amount of water used by each one of us, to include direct and indirect usage, is called our water footprint. The average American uses between 80 and 100 gallons of water each day!

## **Procedure:**

### **Part I - Demonstration of the amount of Water on Earth**

- Fill the large beaker to the 1000mL line with water. Put two drops of blue food coloring in the water and stir, so it is easier to see.
- Explain to the students this represents all the water found on Earth.
- Ask the students where most of the water on Earth is located. Use the world poster as a reference.
- Next pour 30mL of the water from the large beaker into the 100mL beaker. Tell the kids this represents the Earth fresh water or about 3 percent of all the Earth's water.
- Take the salt shaker and shake salt into the remaining water in the large beaker and add 4 drops of yellow food coloring and stir, to represent that the water is saltwater.
- Next ask the students what they would find at the poles of the earth. Inform them that about 80 percent of the Earth's freshwater are frozen in ice.
- Pour 6mL of water from the 100mL beaker into the 10mL beaker. The water left in the 100mL beaker represents ice. You may add another food coloring (drop of red) so that this represents ice.
- Explain that the water now in the 10mL beaker represents NON-FROZEN FRESH water.
- Take the eyedropper and remove a single drop (0.003mL) of water from the 10mL beaker. This drop represents CLEAN, FRESH, AVAILABLE water. You may want to drop this into a plastic cup or a metal can for the sound effect.

### **Part II - Your Water Footprint**

- Tell your students that the average American uses between 80 and 100 gallons of water per day in their own home just for preparing food, bathing, washing clothes and dishes, flushing toilets and watering lawns and gardens.
- Have the students break up into small groups and make their best guesses on how much water they directly use each day. Each group should nominate someone to write down their ideas on a piece of paper. You may have to give them a few examples of direct usage to get started (flush toilet, take a shower). Remind them that they may do these things more than once in a day.
- Have each group think about how they indirectly use water (making a t-shirt, producing a hamburger) and instruct each group to again write down with what they come up with.
- Have each group share their lists with the entire class.
- Lead a discussion on how much water they think each of the direct & indirect uses would use.
- Play the Water Consumption game.
  - Give each group a set of answer paddles (A and B).
  - Explain to the groups that you will be showing them two similar items (A and B) and they need to try and guess which item (A or B) uses more water to grow, make, produce, etc.
  - Each group will need to decide which item (A or B) uses the most water and hold up

- the corresponding paddle (A or B).
  - Use the list of usages for more explanation
  - Use the dry erase score card to keep track of each team's score
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- After the game, complete the provided water footprint calculation worksheet. Then have each student calculate their own water footprint. This can be done using an online water footprint calculator or by printing copies of the provided water footprint worksheet.  
[www.h2oconserve.org](http://www.h2oconserve.org)  
[www.waterfootprint.org](http://www.waterfootprint.org)
  - Discuss ways in which they can reduce their water footprint.
  - Use the book *Environmental Footprints: How big is your footprint?* For more ideas on saving water indoors and outdoors.