
RAIN ROULETTE

OBJECTIVE

To illustrate the importance of water conservation by understanding how rainfall and water usage affects everyday life. To explore options to conserve water. To challenge youth to take the 40-Gallon Challenge.

BACKGROUND

Water conservation is the process of decreasing the amount of water we use by using new technology, improving the old technology that we already own, or changing how we do things.¹ Sometimes, the water that we use does not do exactly what we plan. **HOW** we use water becomes just as important as the **AMOUNT** of water we use. But where does the water go? In a home, the water sometimes flows down the drain, instead of washing things or providing drinking water. To reduce the water wasted this way, it is important to fix drips, turn off water while brushing teeth, or simply use low-flow faucets. Outside, the water might run off into a creek or evaporate back into the air before it waters the crops. The amount of water wasted outside can be reduced by using center-pivot sprinklers, where water is sprayed above crops more evenly than through flooding irrigation. In really dry areas, center-pivot irrigation uses drop sprinklers where the water is sprayed low to the ground. Drip irrigation is a costly, but effective, type of irrigation system. The water is delivered straight to the roots of the plants, which decreases evaporation and run-off. With drip irrigation most of the soil surface remains dry, which decreases the need for more chemicals to control weeds.² Also, simply watering crops and plants during cooler parts of the day, like sunrise, help reduce evaporation.

In gardens, a great water conservation resource is rain barrels. Rain is collected in barrels for later use in the garden. $\frac{1}{4}$ inch of steady drizzle for an hour over a 50 square foot piece of tin can fill the 1 square foot box used in this activity. The same $\frac{1}{4}$ inch of steady drizzle over a 50 square foot piece of tin can fill the 3 gallon bucket used in this activity in 24 minutes. To help decrease evaporation, many rain barrels are closed. One way to use a closed rain barrel is to catch the rain on a roof and then trap the rain in a gutter that directs the water down a pipe straight into the barrel. A spigot is then attached to the bottom of the barrel so that the water can be used when it is needed. Barrels, cisterns, and tanks all collect water for future use.

VOCABULARY³

- Cistern: A container for holding water, especially rainwater. Historically, a cistern was underground.
- Evaporation: The process where water changes from a liquid form to a vapor form in the air.
- Irrigation: To supply dry land with water by means of ditches, pipes, or streams; water artificially.
- Sustainable: using a resource so that the resource is not depleted or permanently damaged.
- Conservation: a careful preservation and protection of something.

ACTIVITY

SUPPLIES

- 1 square foot water-proof box or a 3 gallon bucket
- 1 plastic ruler with big numbers
- 1 Garden Water Needs Chart
- 1 Average Rainfall Spinner or 1 Average Rainfall Graph

- 40-Gallon Challenge Worksheet
- Several gallons of water
- Cups
- Chart page
- Markers
- 2 dice

PROCEDURE

Before the workshop: Tape the plastic ruler to the inside of the box or 3 gallon bucket.

Activity: Spin the Average Rainfall Spinner. Pour the amount of water indicated into the container. Take out the amount of water the garden used in January, according to the Garden Water Needs Chart. Progress through the months, adding more water according to how much rain fell and taking out water according to how much the garden used during the month. Keep track of all additions and subtractions on the chart page by graphing how much water is left in the box each month.

Options: You can use a 1 square foot water-proof box or a 3 gallon bucket. The procedure will stay the same no matter which container you use. Also, instead of using the Average Rainfall Spinner, you can use the total amount of the two dice and the Average Rainfall Graph. Create the spinner using the template provided. Spin the hand and pour the amount of water indicated on the Spinner into the bucket. Continue the activity as instructed above.

DISCUSSION IDEAS

- “Mid-summer/late-summer”: We’ve run out of water (or nearly have). What are our options? Should we let everything burn and in the fall restart with a harvest crop or try to save the last little bit of the summer crop? Most of the summer crops should be harvested by now.
- What can we do to make the water last longer? How do we decrease the amount of water used or wasted without hurting the crops?
- What would happen if there were several months of very low rainfall? What would happen if there were several months of very high rainfall? How would that affect the crops?
- What are other ways that we use water? What are some water wasters that happen?
- How much water can be collected from your roof in a downpour? Remember, $\frac{1}{4}$ inch of steady drizzle over a 50 square foot piece of tin can fill a 1 square foot box in an hour and a 3 gallon bucket in 24 minutes.
- Notice that throughout the year, we had no control over how much water went into the box. When it rained, it rained. When it didn’t, it didn’t. We didn’t control if it rained or not. We could control how much water was taken out though. Look at the 40-Gallon Challenge. What can your family do to conserve water at home?

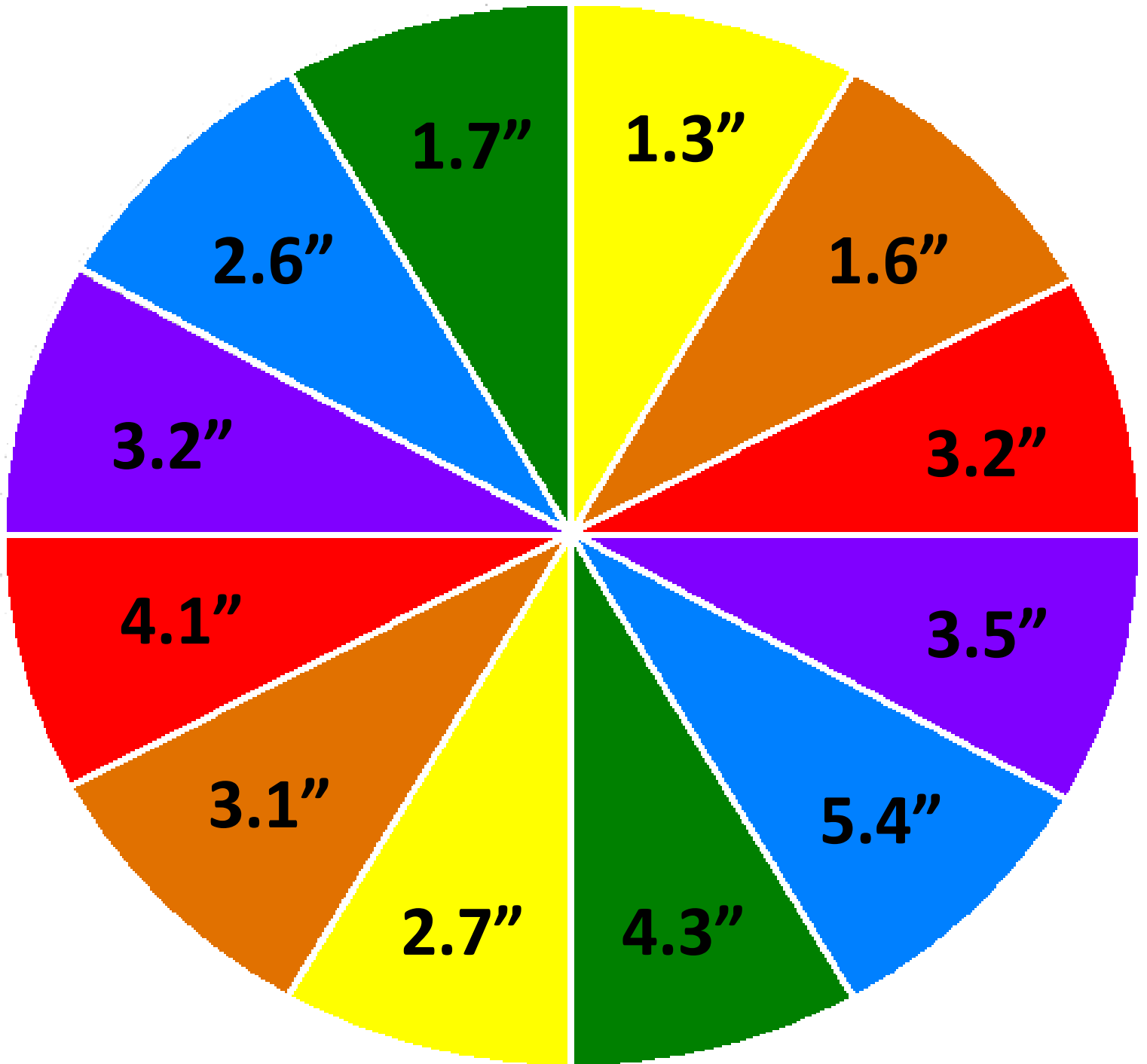
REFERENCES

- ¹Peter H Gleick. (2003). WATER USE. *Annual Review of Environment and Resources*, 28, 275-314. Retrieved September 2, 2010, from Research Library. (Document ID: 531190531)
- ² USDA Irrigation and Water Use: Glossary: <http://www.ers.usda.gov/Briefing/wateruse/>; Drip Irrigation, <http://www.wsi.nrcs.usda.gov/products/W2Q/downloads/Irrigation/ChapterSeven.pdf>; Sprinkler Irrigation, <http://www.wsi.nrcs.usda.gov/products/W2Q/downloads/Irrigation/ChapterEleven.pdf>
- ³Merriam-Webster Dictionary: definitions, <http://www.merriam-webster.com/>

AVERAGE RAINFALL GRAPH

Dice Number	Rainfall for the Month
2	1.3"
3	1.6"
4	3.2"
5	3.5"
6	5.4"
7	4.3"
8	2.7"
9	3.1"
10	4.1"
11	2.6"
12	1.7"

AVERAGE RAINFALL SPINNER



GARDEN WATER NEEDS CHART

Month	Water Needed (Inches)
January	0
February	0
March	2
April	2
May	4
June	6
July	8
August	6
September	4
October	2
November	0
December	0



Take The 40-Gallon Challenge!

Complete this pledge card today to join the 40 gallon challenge and be automatically entered into a drawing to win a free rain barrel. Only _____ County residents who pledge saving 40 gallons or more are eligible to win.

In addition to my existing water conservation practices or actions in the past, I pledge to:

Indoors	Daily Savings*	Check to Pledge
Run the dishwasher only when full	2 gallons	<input type="checkbox"/>
Not leave water running while rinsing dishes	5 gallons	<input type="checkbox"/>
Turn off water while brushing teeth (twice daily)	8 gallons	<input type="checkbox"/>
Shorten showers by 2 minutes (once daily)	5 gallons	<input type="checkbox"/>
Fill the bathtub half full while bathing	18 gallons	<input type="checkbox"/>
Not use the toilet as a wastebasket (once daily)	2 gallons	<input type="checkbox"/>
Wash only full loads of laundry and cut back by one load per week	5 gallons	<input type="checkbox"/>
Fix a leaky faucet	15 gallons	<input type="checkbox"/>
Fix a leaky toilet	30 gallons	<input type="checkbox"/>
Install aerators with flow restrictors on kitchen/bathroom faucets (3)	14 gallons	<input type="checkbox"/>
Purchase a new, more efficient clothes washer	10 gallons	<input type="checkbox"/>
Replace old, non-efficient toilet with new low-flush toilet (4 flushes daily)	8 gallons	<input type="checkbox"/>
Outdoors	Daily Savings*	Check to Pledge
Make a compost pile instead of using the garbage disposal	4 gallons	<input type="checkbox"/>
Use a 55-gallon rain barrel to capture rain water for watering landscape/garden	5 gallons	<input type="checkbox"/>
Use a broom instead of a hose to clean driveways and sidewalks (twice weekly)	22 gallons	<input type="checkbox"/>
Water yard after midnight and before 10am	20 gallons	<input type="checkbox"/>
Reduce overwatering by reducing irrigation cycles by 2 minutes (5 irrigation stations, watering three times weekly)	80 gallons	<input type="checkbox"/>
Reduce overwatering by eliminating one irrigation cycle per week	30 gallons	<input type="checkbox"/>
Adjust sprinklers to reduce overspray onto sidewalks, driveways, etc.	20 gallons	<input type="checkbox"/>
Repair pipe leak or broken sprinkler head (1)	20 gallons	<input type="checkbox"/>
Add mulch (2" – 3") around trees and plants (1,000 sq ft)	25 gallons	<input type="checkbox"/>
Install water-efficient drip irrigation system	20 gallons	<input type="checkbox"/>
Install a "smart irrigation controller" that adjusts for temperature and precipitation	40 gallons	<input type="checkbox"/>
Use automatic car wash that recycles water instead of hand washing cars (weekly)	18 gallons	<input type="checkbox"/>
Replace part of my lawn or high water-use plants with native or drought tolerant plants (1,000 sq. ft.)	40 gallons	<input type="checkbox"/>
Repair any leaks around pool or spa pumps (1)	20 gallons	<input type="checkbox"/>
Repair any leaking hose bibs	20 gallons	<input type="checkbox"/>
Install a pool cover to reduce evaporation	30 gallons	<input type="checkbox"/>
Install spa cover to reduce evaporation	5 gallons	<input type="checkbox"/>
<small>*Actual water savings from these actions depends on a number of factors, including a household's water pressure, number of residents, age/efficiency of plumbing devices, size of landscapes and irrigation systems, personal behaviors, etc. These daily estimates for an average household are provided solely as an educational guideline to help the public understand and appreciate the potential of these actions to help the region save water.</small>		<input type="checkbox"/>

Total Savings Pledged: _____ Gallons per Day

Full Name: _____ Age: _____ Date: _____

Address: _____ City: _____

Zip Code: _____ County: _____ Phone: _____

Email: _____ Please return to: _____ County Extension Office