



Theme: Sustainability (Grades 6 to 8)

Pre-Visit Activity #2

Create Your Own Rainwater Harvesting System

Overview:

As the demand for water increases in Las Vegas and as the water level in Lake Mead decreases, there are many ways that citizens like you can save water. It only rains 4 inches on average each year. That is not a lot of water when you think about the fact that the average family uses eighty gallons of water a day! In order to live more sustainably in the desert, families and facilities like the Springs Preserve have begun harvesting rain water. Although this may sound like a new sustainable practice, people throughout the world have been doing this for years.

Why harvest rain water?

The majority of water used in summer is used outdoors, which is when most areas face water shortages and have water restrictions. This water shortage period is when plants and trees require water the most. As populations grow, water shortages occur. More and more cities are incorporating metering systems as a way of monitoring and restricting fresh water wastage. Saving rain water saves money and helps the environment. The more rainwater that is used, the less the need there is to use chlorinated or other chemically-treated tap water. Also, if rainwater is used, less tap water will go into storm sewers where it is mixed with oil and other toxic residues from streets, parking lots, etc., allowing for more use of settling ponds to remove these toxins.

How it works

The average roof sheds over 100 gallons of rainwater per hour during a moderate rain fall. A rain water harvesting container is designed to capture some of this water. A rainwater barrel, such as the one seen here, collects the rain coming from the roof drain and then sends the water to the plants.



The Springs Preserve catches rainwater in a similar manner, but with bigger water-catching systems. The captured water is sent to flush toilets and water plants.



Advantages of using rain water for the garden

Rainwater is at more favorable temperatures for plant growth than cold well water. It is not chlorinated or treated with chemicals as most municipal water supplies are. Soft, pure, chemical-free rainwater maintained at proper temperatures helps plants grow vigorously. Cold chlorinated water from most tap systems can shock plants and slow their growth.

Environmental advantages of using rain water

As water delivery systems age, there is a greater need to control bacteria that grow along the pipe walls. Extra chlorine or other treatments are necessary to control the bacteria; this extra-strength chlorinated mixture can damage nature's helpful soil micro-organisms, which are useful in the development of good healthy soil. Rainwater harvesting reduces the flow of chemical-rich water into storm sewers and may eliminate or delay the need for costly water expansions.

Advantages of using a rainwater harvesting system for women and children in third world countries

Rainwater harvesting can help improve the lives of women and children in traditional societies where the domestic water supply would otherwise require daily travel to distant wells or streams. These Indian villagers, carrying vessels of water over several kilometers, could potentially benefit from rainwater as a supplemental supply.



Activity:

Create your own rainwater harvesting system by using recycled materials from home.

Instructions:

1. Split students into cooperative groups of 5 to 6 students each.
2. Have students brainstorm with the group a list of possible containers. Encourage them to think creatively. They should consider anything that is an open-topped container that can be recycled as a rainwater harvesting container.
3. To get the group thinking in the right direction, start off the list with ideas such as old buckets, old clay pots, metal tubs, etc.
4. Assign the students the homework of looking around their homes for new ideas and bringing in at least one additional idea to add to the list.
5. Once each group decides on their container, take them on a walk around the school grounds to look for an area where they can place their containers. Remember to place them in an area out of the way and to notify the proper school supervisors of the experiment.
6. Wait until the next rainfall.
7. Have students retrieve their rainwater harvesting systems and take them back to class.
8. Using a graduated cylinder, have each group carefully measure in mL the amount of water they have collected.

9. Once all groups have measured and recorded their results, have the groups share their results
10. Each group should collectively bottle up the water into one container.
11. The class can then decide if they want to use the water to water indoor plants, etc.
12. Have each group answer the discussion questions.

Discussion Questions:

1. Did each group place their containers in similar places, or not?

2. What types of containers did each group use? Did the sizes differ?

3. Which group collected the most water? Why do you think this is the case?

4. Did each group collect their containers at the same time? Why is it important to have done that?

5. Draw a picture of your rainwater harvesting container.

6. How much water did your group collect?

7. How much water did you collect as a class?

8. If there are 500 classes that each collected the amount of water that you did, how many milliliters of water would you have to water plants?

9. Do you think a more sophisticated collecting system should be used at homes in Las Vegas? Why or why not?

10. If you were to do this experiment again, how might you need to modify your container to catch water more efficiently?