



girl scouts



DESERT
BOTANICAL
garden®

WILD WATERWORKS

RECOMMENDED GIRL SCOUT LEVELS:

Juniors, Cadettes

INTRODUCTION:

The Sonoran Desert receives an average of 10 inches of rainfall annually. There are two distinct rain seasons—winter and late summer. Most desert plants and animals can cope with scarce water and are adapted to not only survive but also thrive under these conditions.

Desert plants have special traits that allow them to store and collect water when it rains. During the summer rainy season, called monsoon season, there can be thunderstorms and flash floods. This runoff is a critical resource for desert life, whether it is providing a temporary pool for a spadefoot toad groundwater recharge for urban desert dwellers or irrigation.

Water is life in the Sonoran Desert and it must be protected and conserved. Without a reliable water source, humans could not survive. By completing this virtual water patch, you will identify ways to save water at home and understand the importance of water conservation. To complete the patch requirements, Juniors should complete the main project and four or more elective activities, and Cadettes should complete the main project and six or more elective activities.

[You can purchase the \\$5 Desert Botanical Garden Patch by clicking here.](#)



RESEARCH:

To find more information about water click on the links below.

- discoverwater.org/use-water-wisely/
- kids.kiddle.co/Water
- wateruseitwisely.com/tips/category/kids/
- mocomi.com/rain-harvesting/



Answer these questions as you go through the different sections.

- Why is it important to save water?
- How can you conserve water at home?
- What is potable water? How is it different from nonpotable water?
- What is rain harvesting?

MAIN PROJECT

Monsoon rains start and end quickly and often do not soak deep into the ground where plants can access it. Humans use many different methods for storing water, including dams, reservoirs, wells and ground aquifers. Building these water storage systems allows people to access the water year-round, which has allowed people to adapt to the environment.

Did you discover the difference between potable and nonpotable water in your research? Potable water is clean drinking water that is safe for people. Nonpotable water is not safe for humans to drink, but it is great for watering plants, doing laundry, toilet flushing and use in cooling towers.

In this activity, you become a water engineer (a person who designs and builds systems for water) and complete a **design challenge to build and create a rain catchment system**. It will collect and save nonpotable water for later use. Your rain catchment system needs to collect and store at least three cups of water.

What does it need to do?

- Stand up by itself
- Be movable to water plants
- Keep leaves and bugs out
- Collect and hold at least 3 cups of water



MATERIALS:

Be creative when looking for materials to use for this challenge. Below you will find a suggested list of materials to collect and use.

- Pitcher with water
- Gallon container
- Tape
- Scissors
- String
- Cheesecloth/coffee filter
- Rubber band
- Plastic containers
- Paper towel roll
- Straw
- Measuring cups set
- Printable observation sheet (optional)



Have fun with this design challenge!

PROCEDURE:

1. Using the optional observation sheet or a blank piece of paper, brainstorm and draw at least three different water catchment systems. Select your favorite system to plan and build and don't forget the requirements you need to meet.
2. Gather the materials from around your home. Look for items that are lightweight but sturdy to withstand the elements.
3. Build your rain catchment system.
4. After you complete your rain catchment system, it is time for testing. Before pouring water over your rain catchment structure, think about how monsoon rain falls. Does it rain really hard for a short time or is there a light rain for a long time? You can mimic a monsoon by getting a hose to spray water in the air or a pitcher with water to pour over your rain catchment device for one minute. To get reliable and accurate results, make sure you use the same rain method for each test.
5. How much water did you collect? Pour out the water into your measuring cups, and note how much water you collected on your observation sheet.
6. Think about how your system performed and how it could be improved. Did it have any leaks? Could you make the spout bigger? Does it need to be more stable? Make modifications to your rain catchment system to collect more water.
7. Repeat steps four through six, two times for a total of three trials.
8. After your last trial, draw out your final rain catchment system on your observation sheet and label the different parts.
9. When you finish with the trials, you can use the water collected to water a plant.

EXTENSION:

Visually display your data and findings by creating a bar graph that compares the number of cups after each trial. Plot trials one, two and three along the x-axis, and plot the amount of water collected on the y-axis. Add a title to the graph and colored bars to distinguish each trial.

LIST OF ELECTIVE OBJECTIVES:

- Where does water from your faucet come from? Retrace the flow of water from your faucet back to a natural body of water.
- Locate and visit your local water treatment facility.
- Describe the term “watershed,” and then locate yours on a map.
- Create a five-step plan for your family to use less water.
- Phoenix uses a canal system to transport water. Visit a canal near your home, and take a walk alongside it to see what you observe.
- Plant a cactus or succulent that has minimal water needs.
- Become a water detective, and see if you can find any water leaks in and around your home.
- Time yourself and see how fast you can shower to limit the amount of water that you use.
- Write a story about what life would be like if you woke up one day and no water came out of your faucet. How would this affect your activities?
- Visit a natural body of water, and clean up at least 10 pieces of human-made objects that don't belong.

OTHER INFO:

After you have completed the activities you can purchase the \$5 Desert Botanical Garden Patch by [clicking here.](#)

Share your results and projects with us on the Garden's social media by tagging [@dbgphx](#).

If you have any questions or concerns, contact John Bello at jbello@dbg.org. If you choose to purchase a patch, you should receive it within 10-14 days.




OPTIONAL PRINTABLE OBSERVATION SHEET:

Requirements:

- Stand up by itself
- Be movable to water plants
- Keep leaves and bugs out
- Collect and hold at least 3 cups of water

Sketch your ideas here:

A large, empty rectangular box with a thin black border, intended for students to draw or sketch their ideas for a water collection device.

Circle the idea you want to try

Visually display your data and findings by creating a bar graph that compares the number of cups after each trial. Plot trials one, two and three along the x-axis, and plot the amount of water collected on the y-axis. Add a title to the graph and colored bars to distinguish each trial.

	Trial 1	Trial 2	Trial 3
Date/Time			
Method of Rain: Hose or Pitcher			
Amount of Water Collected (measured in cups)			
What I want to change to improve the design			

Sketch of final design.

Graph:

TITLE: _____

