



Your Rainwater Harvesting System Worksheet

Using the information you have gathered from your explorations, follow the directions below to design the rainwater harvesting system of your choice.

1. Clarify your CRITERIA and CONSTRAINTS

- a. How have you made these customer criteria more specific, and how will you meet them?

Customer Criteria	Revised to be specific	What will you do to meet the criteria?
Design a passive rainwater harvesting system.		
The system must provide shade.		
The system must sustain plants through efficient use of available water.		

- b. What additional criteria have you added as you've moved through the engineering design process and how will you meet them?

Additional Criteria	What will you do to meet the criteria?



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- c. How have you made the customer constraints more specific and how will you meet them?

Customer Constraints	Revised to be specific	What will you do to fit within the constraints?
Use available water.		
Infiltrate water in 96 hours.		
Ensure the rainwater harvesting system is safe.		

- d. What additional constraints have you added as you've moved through the engineering design process and how will you meet them?

Additional Constraints	What will you do to fit within these constraints?

2. Required Documents for Designing your Basin

Schoolyard Site – Lesson 4

- Site Map with Water Flow
- Schoolyard Inspection Data Sheet

How Much Rain Can We Collect? – Lesson 5

- Supply Worksheet

Proposed Plants – Lessons 6-7

- Proposed Plants Worksheet

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- **Proposed Plants Canopy Area**

Water Budget – Lesson 7

- **Water Budget Calculation Worksheet**

Basin Sizing – Lesson 8

- **Basin Sizing Worksheet and Calculations**
- **Basin Sketches**

3. Basin Design

Check the to-scale drawings of your basins from Lesson 8 and add to it or start another one. It would be good to have a map or overhead view and a cross-sectional view of the site. Label all parts.

- a. Will water flow through your site by gravity? Is the highest elevation nearest your collection area?
- b. Have you used your chosen area well? Do you have basins that infiltrate the water in a pleasing pattern over the area?
- c. What depth are your basins?
- d. Are there places where you want to construct berms (small mounds) to slow the flow of runoff?
- e. Are there places where you want swales to direct water from one place to the other?
- f. Are there places where you want to slow the flow of water?
- g. List the parts of your system that need to be installed. Include sizes, quantities, or special features in their descriptions, if applicable.

4. Onsite Plant Arrangement

Using the Basin Drawings or another piece of graph paper, plan your plant placement within and around the basins paying attention to their water needs.

- a. Where should the water for trees go? Trees should get water out beyond their tree canopies, so they shouldn't be planted in the bottom of basins.
- b. What kinds of plants help water infiltrate into the soil? Grasses have a lot of active roots and can help infiltration so they should be planted in the basin bottoms.
- c. Desert plants like cactus can be planted outside of the basins. They've adapted to our arid climate and periods with no rain.

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- d. Native flowering plants and shrubs can go into the sides of the basins and should be arranged in ways that makes the landscape pretty. Think of color, height, width and structure.

5. Collection and Conveyance

On another piece of graph paper, plan your rainwater conveyance system from your collection area.

- a. Draw your collection area to scale and label it.
- b. Identify where the water will come off the collection area.
- c. How will the water get to your basins? What conveyance structures are needed?
- d. If the water runs directly off of the roof, how will you capture it and direct it to your basins? If the water runs off a lower surface area like a parking lot, how will you direct it?
- e. List the parts of your system that need to be installed. Include sizes, quantities, or special features in their descriptions, if applicable.

6. Put It Together

Now put the pieces together on a more generalized schematic of your system on a separate piece of paper. Label all parts. Test your ideas by sketching arrows to show the flow of the water. Are all of your parts needed? Are you missing any parts? Are all of your criteria and constraints addressed? Modify your lists of parts and your schematic until you have everything covered. **A schematic shows connections between parts.**

7. Presentation

Prepare to present your design. In addition to the drawing, your presentation should include words and numbers to answer the following questions:

- a. How did you solve the problem?
- b. How did you meet the criteria?
- c. How did you accommodate the constraints?

Describe at least one decision you made in order to improve your design or better meet the criteria and accommodate constraints.