

Rain Barrel

Rain barrels are low-cost water conservation devices that can be used to reduce runoff volume and, for smaller storm events, delay and reduce the peak runoff flow rates. By storing and diverting runoff from impervious areas such as roofs, these devices reduce the undesirable impacts of runoff that would otherwise flow swiftly into receiving waters and contribute to flooding and erosion problems. Rain barrels can provide a source of chemically untreated 'soft water' for gardens and compost, free of most sediment and dissolved salts.

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Step 1 - Let's Begin

- Identify project participants (students and teachers)
 - Assign group leaders to communicate with maintenance staff
- Begin securing partnership involvement
- Get written agreement from school administration and maintenance staff
 - Clarify roles and responsibilities
 - Each school may allow a different amount of landscape changes
 - Ensure that there will be open communication throughout the project

Step 2 - Goals/Objectives and Budget

- Outline project goals and objectives
- Estimate amount you intend to spend [Budget]
- Establish link between current school curriculum and environmental enhancement project.

Cost

Rain Barrel with sealed top \$120
Overflow Kit/Runoff pipe \$35
Rain Diverter \$18
Soaker Hose \$21
Linking Kit \$12
Spigot, if not supplied \$5
Additional Guttering \$5
TOTAL ESTIMATED COST: \$216

Although costs vary somewhat between manufacturers, in general, the cost of a single, rain barrel roof top water catchment system, minus the down spout and other accessories, averages about \$120. Costs can be reduced still further by constructing your own barrel (see Step 7), which can be done with basic supplies for as low as \$20.

While rain barrel installation costs are relatively easy to quantify, the costs savings, both to the individual and the local utility system are not as easy to measure. Nevertheless, it is reasonable to expect that widespread use of rain barrels or cisterns will decrease the hydraulic loads and hence the costs required for the construction and maintenance of off-site storm drain systems. The reduction in volume on the local water distribution system can extend the overall life of it.

Step 3 - Gather Information

- Walk around and survey the school grounds to identify potential areas for project implementation (i.e. areas where water ponds during/after storms, areas where there is a lot of erosion, landscaping doesn't get enough water)
- Identify gutters/downspouts
- Request assistance maintenance staff
- Investigate permit requirements
- Make list of problem areas
- Take pictures of problem areas
- Conduct informal survey of school community (including students, staff, parents, and maintenance staff) to determine their satisfaction with the current state of the school environment.

Step 4 - Location and Size of Rain Barrel

Now that you have walked the campus, gathered all of the maps and materials you need, talked to the facilities manager, surveyed your fellow students and teachers, and listed the problem areas or potential areas for your rain barrel, here are things to consider when locating and sizing your rain barrel.

- Two primary factors to consider when designing a rain barrel are:
 - Planning the location of your rain barrel
 - How to determine the size of your rain barrel [see Step 7 - Construction]

Site considerations for a rain barrel

Space Needed – Not a Factor

Soils – Not a Factor

Slopes – Needs to be on a flat surface

Depth To Water Table – Generally not a Factor

Depth To Bedrock – Not a Factor

Proximity To Foundations – Not a Factor

Max. Depth – NA

Distance To Septic Tanks – NA

Maintenance – Generally low, only routine inspection required of all components

Step 5 - Designing Your Rain Barrel

Now that you have determined the location of your rain barrel you can begin to design it.

The design of any rain barrel is relatively simple, with its basic components consisting of:

- The actual barrel, often made of plastic, and recommended to be at least 55 gallons. Most pre-manufactured barrels average about 60 gallons.
- A sealed yet removal child resistant top to keep potential pests out, but still allow easy access for cleaning. Screens, at the barrel entrance are often included to reduce particulate matter and the potential for mosquitoes.
- Connections to the downspout, runoff pipe, and spigot.

A number of accessories can be added to the basic barrel design and include:

- Expanded storage volume, by connecting the barrels.
- A water diversion soaker hose, to allow for the slow discharge of water for a needed purpose such as lawn irrigation.
- An automatic overflow so that water will not back up into the system.
- An overflow irrigation design.

Step 6 - Design Review and Obtaining Permission

Once you have a schematic design of your rain barrel, schedule a meeting with your principal and facilities/maintenance manager. This is an information gathering meeting and be prepared to make revisions based on the discussion at the meeting.

Be prepared to discuss the construction and maintenance issues with the principal and maintenance staff.

[Read the following steps (Step 7 – Construction and Step 8 – Maintenance) to understand the materials, material delivery, and site preparation procedures.]

During the meeting:

- Review the draft design

- Discuss the construction of the rain barrel
- Find out about school regulations about delivery and storage of materials and equipment that will be used for construction of the rain barrel.
- Discuss the maintenance issues (roles and responsibilities)

Step 7 - Construction

Home made rain barrels are relatively easy to construct from 55-gallon drums and a few other basic components.

The following is a simple construction sequence:

1. Drill holes for fittings. First drill three holes in the barrel. One for the spigot to connect your garden house to the barrel and the other fittings to allow for more barrels in the future. One of the barrels must have an overflow fitting near the top of the barrel. If you plan on using 3/4 inch fittings use a 1 inch hole saw to cut the holes. If you have an adjustable hole saw make it a little smaller than 1 inch.

2. Attach fittings. Place plumbing sealant on a 3/4 inch galvanized metal nipple and its threads. Using a pair of locking pliers, thread the nipple into the barrel hole for the fitting.

3. Cut the down spout at the proper height. You should place the rain barrel on one or two concrete blocks and then determine the proper height. After cutting the down spout attach the necessary elbows and extensions to have the down spout reach the barrel. Attach a 4 inch by 2 inch ABS plastic converter to the end of the down spout and attach a fine mesh screen over the converter (you can use a paint sprayer filter which you can get at a hardware store for about \$1).

4. Add additional barrels. If you wish to add more barrels do so at this time. Attach a garden hose Y fitting on the 3/4 inch nipples. Position the barrels on top of the concrete blocks and cut the right length of garden hose to connect the barrels (with male fittings attached to both ends).

5. End product. Attach an overflow line on the first barrel. Place it near the top of the barrel and attach it to hose or tube for any overflow. Note that you must remove one of the two bung fittings on the top of the barrel and cover it with a small screen.

Step 8 - Maintenance

Maintenance requirements for rain barrels are minimal and consist only of regular inspection of the unit as a whole and any of its constituent parts and accessories. The following components should be routinely inspected, at least twice a year, and either repaired or replaced as needed. 2

****NOTE:** Make sure to empty the rain barrel between rainstorms.

- Roof catchment, to ensure that no particulate matter or other parts of the roof are entering the gutter and downspout to the rain barrel.
- Gutters, to ensure that no leaks or obstructions are occurring.
- Downspouts, also to assure that no leaks or obstructions are occurring.
- Entrance at rain barrel, to ensure that there are no obstructions and/or leaks occurring.
- Rain barrel, to check for potential leaks, including barrel top and seal.
- Runoff / overflow pipe, to check that overflow is draining in non-erosive manner.
- Spigot, to ensure that it is functioning correctly.
- Any accessories, such as rain diverter, soaker hose, linking kit, and additional guttering.

Step 9 - Advertise

- Spread the word!!!
- Develop a website
- Provide an outline of goals and objectives
- Post pictures
- Advertise URL through school newspaper, public television
- Update often

Step 10 - Create Timeline

- Order supplies
- Arrange for material delivery
- Advertise work days on web and in school newspaper
- Ask for volunteers
- Create timeline for project completion

Step 11 - Preliminary Plans for Construction Day

Some final preparations need to be made to make your construction day a success.

Be sure to:

1. Notify your school administrators and maintenance staff that the construction will begin
2. Call key volunteers (Ask them to arrive early and be Team Leaders)
3. Ask volunteers to bring gloves, shovels, and water bottles (make sure their tools are labeled with their names)
4. Create a Task List
5. Delegate responsibility so that you can be free to coordinate on construction day
6. Print out and copy the Construction Sequence page
7. Get an Emergency Kit and set up an Emergency Plan
8. Make sure building door(s) are open so that volunteers can use bathroom facilities
9. Make sure you have access to water hose
10. Provide refreshments and snacks (if possible) – at least provide water
11. Contact local newspaper, or designate a student volunteer or parent to take photos and write about the event
12. Bring camera

Step 12 - Construction Day

Now that all of your materials have been ordered and volunteers have been scheduled it is time to construct your rain barrel.

Prior to construction:

1. Arrive early
2. Take "Before" photo
3. Organize the construction site:
 - Position plants and materials
 - Label tools
 - Place tools that are not being used in a central location
 - Put Emergency Kit on hand in the central location
4. Greet and organize volunteers
 - Have volunteers sign in
 - Delegate responsibilities
 - Announce the schedule and breaks
 - Provide info on emergency plan, bathroom locations, and refreshments
 - Distribute the Construction Sequence information
 - Take photo of all volunteers

During Construction:

1. Take photos of all the construction phases, emphasizing the volunteers
2. Interview the volunteers

Post-Construction:

1. Take "After" photo
2. Step back and appreciate

Remember to:

- Continuously monitor safety
- Have fun!

Step 13 - Write Summary Report

- Write final report
 - Use input from all students involved
- Post names of volunteers on web and in school newspaper
- Take follow-up survey of school community
- Review budget
- Plan long-term maintenance
- Determine future learning outcomes

Step 14 - Keep It Going

- Where do we go from here?!!!

The End!!