

# Rain Barrel Construction 101

## An Informative Resource and User Guide

This handbook was developed to accompany a workshop held in an effort to promote energy and water conservation through the use of rain barrels. The workshop was co-sponsored by Western Kentucky University's Center for Environmental Education and Sustainability and WKU's Office of Sustainability. The project was conceived, organized, and facilitated by students in Dr. Terry Wilson's class, ENVE 560, Investigating and Evaluating Environmental Issues.



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## History of the WKU Rain Barrel Project

The WKU rain barrel project began in the Fall 2010 in Dr. Wilson's graduate course *ENVE 560: Investigating and Evaluating Environmental Issues*. The course is based on a six-step environmental service-learning program known as Earth Force.

"The graduate students inventoried issues on campus and after examining the resources available and the area with the most need, they decided that water management is a major issue that needs attention," Dr. Wilson said. "This came after some research they did to find out that large amounts of energy is needed every day to clean our water to drinking water standards, although much of that water is used to flush toilets, wash cars and irrigate gardens." Working with WKU Sustainability Coordinator, Christian Ryan-Downing, the students obtained 55-gallon plastic barrels from Pepsi Co. and designed the rain barrels. One of the first rain barrels built by the students was delivered and installed at President Gary Ransdell's home.

When the Spring 2011 group of graduate students began the course, Dr. Wilson asked what service-learning project they'd like to complete. The students decided to continue working on the rain barrel project with some small modifications and then expand the project into the local community as a way to conserve water and energy. The rainwater collected in the barrels can then be used to water plants or gardens. "We're making something that conserves water and energy and promotes environmental sustainability," Dr. Wilson said.

A rain barrel is placed under a gutter's downspout next to the house to collect rainwater from the roof. The barrel holds about 50 gallons of water, which can be used to water your garden, pets, and any other use requiring water. Harvesting rainwater has many benefits including conserving water, saving money on your water bill, and helping control drainage issues such as basement flooding. By collecting rain water homeowners are also helping reduce flooding and pollution in local rivers and streams. When rainwater runs off of hard surfaces like rooftops, roadways, parking lots, and compacted lawns it can carry with it pollutions to our rivers and lakes. Harvesting rainwater in a rain barrel is just one of the ways homeowners can reduce rainwater from coming off properties and causing pollution and flooding problems.

Rain barrels at garden stores can cost over \$100.00, but they are actually very easy and inexpensive to construct on your own. The WKU rain barrel is constructed using recycled food grade barrels and buckets. All materials (the spigot, overflow connectors, and screen) can be bought from local hardware stores for a cost of \$20.00 to \$40.00.

## Rain Barrel FAQ

### **My roof is small. Is it even worth it for me to have a rain barrel?**

For an 800 square foot roof area, in a 1 inch rain, 500 gallons of water will come off of a roof this size. If all of your neighbors install rain barrel it can have a significant impact on flooding and pollution within your community.

### **What defense will my rain barrel have against mosquitoes and other insects?**

A mosquito-proof screen on the lid of the barrel helps prevent the intrusion of mosquitoes and other insects.

### **What can I do with the water I harvest with a rain barrel?**

Water collected can be used to water flowers, shrubs, trees, lawn, and garden. It can also be used to wash your car, rinse hands/feet, tools, shoes, etc. and water livestock.

### **What precautions should be taken with using a rain barrel?**

Be sure you have a solid flat base for your rain barrel to ensure it does not tip over. When full, a rain barrel can weigh around 400 pounds. Always keep the lid to your rain barrel tightly secure to avoid any accidents involving children and/or animals.

### **Can I drink the rain water from my roof?**

This water is not meant for human consumption. Rainwater may contain pollutants, algae and other materials that get washed from your roof.

### **How do I clean the inside of the rain barrel?**

We recommend washing the barrel when disconnecting it for the season. Use an environmentally-friendly solution of 2 tsp. of castile soap + 2 tsp. vinegar or lemon juice per gallon of water for cleaning, swishing the solution around inside the barrel then rinsing the inside of the barrel with a garden hose. A concentrated nozzle spray will work well to remove residue from the inside of the barrel.

### **I don't like the color; can I paint or decorate my barrel?**

The barrels are made from high-density-polyethylene (HDPE), to which is notoriously hard to get paint to stick. We have not found a totally environmentally friendly paint that will adhere to the barrel. There are, however, spray-paint companies that make paint specifically for plastics (Krylon's "Fusion"). We recommend placing 'chicken-wire' around your barrel and training some sort of native vine plant to grow up the wire. Some people have built aesthetically pleasing enclosures for the barrel. Another option is to site the barrel hidden among bushes/shrubs to make it less noticeable.



## Rain Barrel Materials

- 55 gallon barrel
- 2.5 or 5 gallon bucket w/lid (Paint Bucket/or other Bucket with lid)
- Aluminum screen
- threaded faucet with flange
- pvc elbow that accepts a garden hose
- Plumbers' tape
- Krylon Fusion spray paint for plastics (for better results try using their primer for plastics first)
- 4 Concrete Blocks (for base)



## Rain Barrel Tools

- Drill
- paddle bit to match size of fittings (faucet and pvc overflow)
- Utility Knife
- Jigsaw
- Rubber Mallet
- File
- Eye Protection



### Stage 1: Small Bucket Preparation

The small bucket will be used as your intake opening for your rain barrel. You will cut the bottom off and use it to mark the hole in the top of the rain barrel. Then you will cut out the center of the lid to make a lid ring, place the screen over the open top and attach it with the lid ring. You will then put the prepared small bucket in the hole in the top of your rain barrel.

#### Small Bucket Prep Instructions



- 1) Remove the lid and cut out the center with the utility knife leaving just the ring that will snap back on the top of the small bucket.

- 2) Cut out a square of screen big enough to cover the top of your small bucket and hang over the edge.



- 3) Use the rubber mallet to secure the lid ring over the screen on the top of your small bucket.

- 4) Cut the bottom of the small bucket off 2 to 3 inches from the bottom using the utility knife or jigsaw. Save this for a template to draw a circle on the top of your barrel.
- 5) If desired, paint the small bucket to match the rain barrel.
- 6) Set this prepared small bucket aside to dry. It will be attached to rain barrel later.





## Stage 2: The Rain Barrel Preparation

The 55 gallon barrel is the main storage and water delivery part of a completed rain barrel. In this stage, prime the barrel base coat of paint. You will drill the 7/8 inch holes (3) for the spigot and overflow connectors. You will then cut the top circle out and connect the small bucket intake the barrel to make it a completed rain barrel to place and begin collecting water.

### Main Barrel Prep Instructions

- 1) Thoroughly clean the exterior surface with a 1:1 vinegar and water solution to remove excess dirt.
- 2) Using a fine to medium grit sandpaper, “remove” rough surfaces or marks off the plastic. Use a dry cloth to remove any plastic shavings.
- 3) Apply one coat of outdoor primer or paint for plastics. You can tint the primer to match the final color of the barrel. We used *Krylon* spray paint. Let it dry as instructed by paint maker.
- 4) Using the top half of the bucket that is cut in half, trace a circle on the top of the large barrel. This will be a guide for the hole you cut into the top of your barrel. (Do not cut the hole the size of the bucket lid, but the narrower bottom part, as you want the bucket to fit very snugly into the hole you cut.)
- 5) Use your paddle bit and drill a starter hole at the edge of your circle.
- 6) Use the jigsaw to cut along the circle you traced. This will be the opening for the intake part you made with rest of the small bucket. Use the file to smooth out any edges.



- 7) Place the small bucket into the hole and use the rubber mallet to tap it in snug. Since the small bucket is tapered from top to bottom, it will fit snug for a tight seal.



- 8) Measure up approximately 2 to 3 inches from the bottom of the barrel and use the paddle bit to drill a hole for the faucet.



- 9) Use the file to smooth the front edge off the hole.

- 10) Wrap the faucet threads with the Teflon plumbers' tape to cover the threads. This will create a seal for the faucet when it is screwed into the hole.



- 11) Thread the faucet into the hole you drilled. This will take some force to get the threads to bite into the plastic since the hole is slightly smaller than the faucet. But by forcing the threads into the hole, you will form a watertight seal without the need for caulk. Place screws into each side of flange to prevent movement of faucet.



- 12) From the top of your rain barrel, measure down approximately 3 inches and use the paddle bit to drill a hole for a runoff connector.

- 13) Use the file to smooth down the outside edge of each hole

- 14) Thread the pvc elbow runoff connector into the hole.

- 15) Use your paint to touch up any scraped areas than may have been created in construction.

- 16) At this point you have a completed rain barrel ready to place at a shortened gutter downspout.



## Painting, Decorating, and Protecting Your Rain Barrel



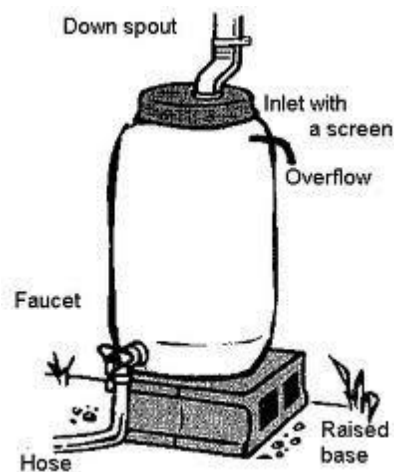
If you don't like the aesthetic appeal of your rain barrel, you can paint it to match your house, or even turn it into a piece of art! You're only limited by your imagination. Painting rain barrels is a great activity for children and can introduce them to important concepts about water quality and conservation. It also has the added benefit of protecting the surface of the barrel from breaking down due to the harsh effects of the sun.

You can use any type of paint on your rain barrel, but if you're using spray paint, one formulated for plastic application will work best. Although one can of spray paint will cover your barrel, a second can will give it a more "finished" look. Darker colors also require more paint.

For a longer lasting paint job, the barrel should be primed first to help the paint adhere to the surface. After you've painted your barrel, it is a good idea to apply one or two coats of polyurethane to protect it.

## Rain Barrel Placement

Rain barrels are often installed near your gutter downspout. Cut the gutter to the desired height to match your installed rain barrel and install a gutter elbow to direct the water into the intake bucket. It is important that your rain barrel be installed on a flat, stable surface to sit upon. We suggest leveled concrete blocks (see below).



## Connecting Your Rain Barrel

Connect main garden hose to bottom spigot. Remember it is important to elevate your rain barrel (see diagram above) as gravity is the force that moves the water out of your barrel and into your hose. We also recommend connecting a short hose to at least one of the runoff connectors (cap the other if not using two hoses). This allows you to control where excess water goes and assists in keeping out insects.

## Rain Barrel Maintenance

Like most things around your home, your rain barrel needs a little regular attention to keep working smoothly. The following are tips to keep your rain barrel in the best shape possible:

- 1) Periodically inspect your barrel for cracks or debris buildup. Light colored barrels that are in direct sunlight may become brittle over time. They can be painted to make them last longer.
- 2) Empty your barrel monthly.
- 3) Clean your gutters regularly to reduce debris.
- 4) Once a year, tip it over during a dry spell and rinse it out with a hose.
- 5) Don't let rainwater sit in your barrel longer than a month if smell is a concern to you or if you start accumulating algae. You can also put a capful of chlorine bleach into the water. That small amount won't hurt plants, but vinegar might -- don't use any type of vinegar in your rain barrel.
- 6) Be sure the base is level and solid as the weight of a full rain barrel can reach upwards of 400 pounds.
- 7) If you have trouble getting the water to come out, remember to keep that hose attachment area clear. Remove the water hose and use a wooden or metal skewer or ice pick to clear out any debris. You can also try adding cheesecloth or muslin on top of the screen to act as an additional filter. If this does not help, you may need to elevate your barrel to get more help from gravity.
- 8) If your rain barrel springs a small leak, most can be repaired with aquarium caulk, a clear sealant available at most hardware stores.
- 9) Use a small hose or cap attached to the runoff connectors to ensure no insects get in the rain barrel through the connector itself.
- 10) To winterize your rain barrel, there are a few different measures you will need to take. First you will want to disconnect the downspout. Return the downspout to its original configuration prior to the rain barrel. Remove the hose and mesh screen and store them. Make sure to drain the rain barrel – this will help prevent it from freezing and cracking. Lastly, you will want to store it upside down, so no water or materials will be able to enter.