

Build a Rain Garden

#FLOODED

Grades 3 - 12

Activity



Main Objectives

Learners will learn about rain gardens and their benefits in managing rainwater runoff. Under the supervision of adults, they will build a rain garden on school grounds or at home. This activity will guide them through all the key steps needed to build and maintain a rain garden.

Learning Outcomes

By the end of this activity learners will:

- Learn about rain gardens and their benefit in managing rainwater runoff
- Get their hands dirty by building a rain garden on their school ground or at their home with the supervision of adults
- Guide learners through all the key steps to consider building a rain garden and maintaining it after

Length of Activity: 1.5 - 2 hours

Step 1: Intro to rain gardens

Step 2+3+4+5: Plan and design the rain garden

Step 6+7: Build the rain garden based on the plan and design

Materials Required

- Internet-enabled device
- Assessment Rubric
- Flood:ED Backgrounder
- Soil
- Compost
- Stones and gravel
- Water Loving Plants
- Shovels
- Rakes
- Wheelbarrow
- Gloves

Activity

Step 1: Learn About Rain Gardens

Rain gardens are small-vegetated depressions that collect, store and infiltrate stormwater runoff. They are built landscape features planted with native species of plants that reflect the ecology of the local watershed. The plants are selected for their ability to withstand moisture ranging from flooded to dry.

Beyond the environmental benefits and the reduction of runoff, the advantages of a rain garden also include:

- Rain gardens can act as an educational resource for educators to engage in hands-on outdoor learning without having to leave the school grounds.
- Rain gardens demonstrate sustainable design practices while encouraging environmental stewardship.

Watch this video tutorial on how to build a rain garden, begin the video at 2:19:



Step 2: Plan Your Rain Garden

Explore your school or community for areas that would be good to build a rain garden. Below are some questions to consider as you find the desirable location for the garden:

1. How is this proposed area being used by learners or community members? Is it appropriate for a rain garden?
2. How will a rain garden help with flooding and drought?
3. What size should the rain garden area be?
4. What is the soil like, is it permeable and fertile?
5. What is the solar exposure (hours per day)?
6. What are the best plants to use given the area?
7. When to plant in year 1, 2 and 3?
8. What permissions will you need?

Step 3: Design Your Rain Garden

Now that you have picked a location, design your rain garden area including the location, plants, and signage. Consider the following questions:

1. Is it receiving water from a disconnected downspout or rain barrel or are you building it in an area where runoff regularly collects?
2. How much runoff capacity will the garden need? How large and deep will the garden need to be?

Use the guide below for additional tips!

 <https://www.familyhandyman.com/project/how-to-build-a-rain-garden-in-your-yard/>

Step 4: Permissions and Safety

When planning to build a rain garden, be sure to include all the school and community stakeholders – principal, caretaker, learners, educators, guardians, neighbours, and facilities staff – in envisioning new opportunities for a rain garden on the school grounds. Get buy-ins for the project and to establish a culture of stewardship to care for the gardens – watering, weeding, and mulching.

Step 5: How Large Should Your Rain Garden Be?

There are various factors that determine the size of the rain garden, for instance:

1. What is the runoff footprint of the surface draining into the rain garden? What percentage of the water runoff will feed into the rain garden from the nearest point?
2. What will be the depth of the rain garden? A deeper rain garden can be smaller.
3. Keep your soil type in mind when deciding on the size of your garden. A garden with clay soil absorbs water slower than one with sandy soil, and therefore should be larger.
4. The garden should be level so that water is spread evenly across its length.

For example:

For a building with a roof surface area of 10 m by 10 m feeding into a downspout, the size of the rain garden is calculated below:

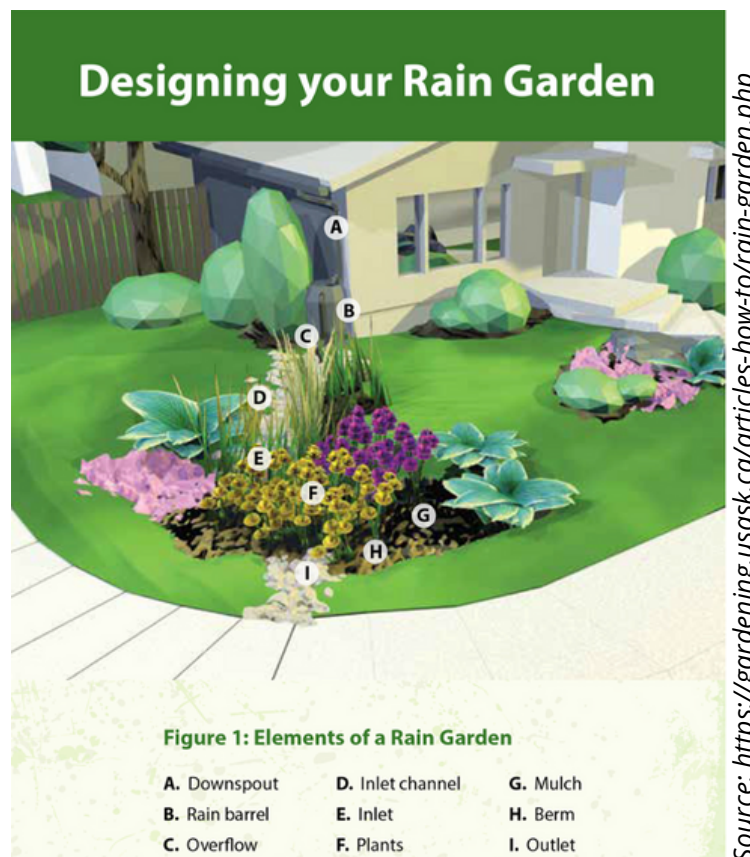
- Collection Area (roof) = $10 \times 10 = 100 \text{ m}^2$
- A typical rainfall event is 10 mm = 0.010 m
- Water Volume = $100 \times 0.010 = 1 \text{ m}^3 = 1000 \text{ litres}$
- Divide this volume of water by the 8 cm = 0.08 m depth of the rain garden
- Area of Rain Garden = $1 \text{ m}^3 / 0.08 \text{ m} = 12.5 \text{ m}^2$

Therefore, the rain garden should be about 3 m by 4 m and will handle 1000 litres of water.

Step 6: Prepare Area Planting

- Ensure the appropriate health and safety measures are put in place
- Clearly stake the boundary of the area. Use four 60 cm wooden pegs.
- Paint the pegs to make them visible.
- Provide accessible pathways and enough area to encourage and allow for exploration.
- Plants can trap litter. Hold regular litter clean-ups to keep the area looking good.

Step 7: Location and Building Considerations



- Place the rain garden in full or partial sun at least 3 m from the building to ensure water won't seep into the ground around the building, but no more than 9 m from the downspout.
- Soil in the rain garden is a special soil mix that is a combination of compost and sand which allows the water to infiltrate quickly. A good mix of soil for a rain garden is about 30% sand, 30% - 40% topsoil and 30% organic material (<http://raingardenalliance.org/right/soil>.)
- There should be about 60 cm thickness of rain garden soil added to ensure enough room for plants. You can use existing soil in rain garden if it provides adequate water infiltration rates, although local soils can also be amended with some sand or compost if needed – remember the composition mix noted in point 2!
- As you watched in the video tutorial, you will need to create an inlet for water to travel into the rain garden. Add small stones at the inlet into the garden to slow the water entering which helps reduce erosion.
- Create an overflow on the downhill side of the garden. You can do this by adding small stones at the overflow, as is done at the inlet – see image in point 4 for reference.
- Plant rain garden friendly plants – i.e., plants that like water but can also be dry – here are some suggestions:

 <https://www.homedepot.com/c/ab/best-plants-for-a-rain-garden/9ba683603be9fa5395fab901b15a41c5>

- Ensure plants are mulched with at least a 5 – 10 cm layer of mulch.
- Create a maintenance program to take care of the plants and to keep the site clean of litter. Here are some resources to get you started with a maintenance plan:

 <https://bluewaterbaltimore.org/wp-content/uploads/2023/09/BWBRainGardenRoutineMaintenance.pdf>

 <https://trca.ca/news/complete-guide-building-maintaining-rain-garden/>

Additional Resources

Here are some additional resources to help you plan and execute this action activity.



Youtube Videos:

1. https://www.youtube.com/watch?v=yzhXNZi1_pM
2. <https://www.youtube.com/watch?v=cYE6De8wSZA>



Websites:

1. <https://www.edmonton.ca/public-files/assets/document?path=Rain%20Garden%20in%20a%20Box%20Handbook.pdf>
2. <https://sustainabletechnologies.ca/home/urban-runoff-green-infrastructure/low-impact-development/bioreten-tion-and-rain-gardens/glendale-public-school-rain-garden/>
3. <https://www.epcor.com/learn/efficiency-conservation/outside/Pages/installing-a-rain-garden.aspx>