SCHOOLYARD RAIN GARDENS

How to Design, Build and Maintain a Rain Garden
Classroom Lessons for Second through Sixth Grades

2nd and 3rd graders planting a rain garden | Spring 2017 | Photo credit: Linda Prieskorn

Washtenaw County Water Resources Commissioner's Office
Funding from the Community Foundation for Southeast Michigan
# Table of Contents

## Part 1  Schoolyard Rain Garden Essentials

- **Introduction** ................................................................. 4
- **Timeline** .................................................................... 5
- **Checklist** .................................................................... 6
- **Locating & Measuring** ................................................ 8
- **Sizing** .......................................................................... 9
- **Drainage** .................................................................... 10
- **Recommended Native Plants** ....................................... 11
- **Determine your Compost & Mulch** ................................. 12
- **Design** ......................................................................... 13

## Part 2  Classroom Lessons

- **Stormwater and the Water Cycle** ................................... 18
- **Designing a Rain Garden** ............................................. 23
- **Rain Garden Factsheet** ................................................ 32

## Part 3  Build Your Rain Garden

- **Site Preparation** ............................................................ 36
- **Digging Workday** .......................................................... 37
- **Digging on a Slope** ........................................................ 38
- **Planting Workday** .......................................................... 39

## Part 4  Maintenance

- **Watering & Transplanting** ............................................. 42
- **Weeding** ................................................................. 43
- **Seasonal Work** ............................................................ 45

## Part 5  Appendix

- **Supplemental Classroom Materials** .............................. 47
PART 1: SCHOOLYARD RAIN GARDEN ESSENTIALS

Completed Rain Garden at Pattengill Elementary, Fall 2017
INTRODUCTION

A rain garden is a shallow bowl-shaped garden that soaks rainwater into the ground and is full of native plants. It fills with the rain that falls on it – plus rainwater that runs off a hard surface like a roof or a driveway. Water running off of hard surfaces picks up pollutants like phosphorus and nitrogen from fertilizers; bacteria from animal waste; oil, grease and heavy metals from cars, and just plain old “dirt” called sediment. Usually this dirty water ends up going down a storm drain and straight into our creeks and rivers, unfiltered. By capturing the rain water in a garden, we are helping to filter the water clean by letting it slowly soak into the ground.

Rain gardens not only filter water, they also create great wildlife habitat and can reduce puddling. By building a rain garden at a school, it can be used as a teaching tool for lessons in plants, soils, habitats, the water cycle and more!

This manual was created by the Washtenaw County Water Resources staff with funding from the Community Foundation for Southeast Michigan. The manual aims to provide you with the information, lessons and expertise needed to build and care for a rain garden at your school.
**Project Plan**
- funding (~$1,000)
- decide on site & see if clay soil
- design
- make plant & supply list
- place orders
- onboard teachers

**Classroom Lessons**
- schedule dates
- get supplies and make copies
- teach lessons

**Plan Workdays**
- schedule digging workday for
  3 hours on a day when parents
  can attend
  - recruit at least 20 volunteers
- schedule planting workday,
  1 hour per class and 2-3
  classrooms of about 28 students
  (set rain dates)

**Prepare for Digging Workday**
- call Miss Dig two weeks before
digging day
- coordinate supply drop offs
- borrow tools
- mark rain garden site with string
  and stakes

**Digging Workday**
- dig shape of rain garden
- add in 2" compost & till into soil
- seed any bare areas where fill
  dirt was placed

**Planting Workday**
- spread the mulch, plant plugs
  and water with students

**Ongoing Maintenance**
- water during the first summer
  (2x/week for 1 hr)
- weed as needed (at least 2x/
year)
CHECKLIST

1. **Plan**
   
   Funding: ____________________________________________________________
   
   Timeline (spring or fall): ____________________________________________
   
   Participating Teachers and/or Staff: ____________________________________

2. **Classroom Lessons**
   
   - Lesson 1: Stormwater and the Water Cycle
   - Lesson 2: Design a Rain Garden
   - Lesson 3: Rain Garden Factsheet
   - Copy best factsheets and give to all teachers and staff in school to communicate project

3. **Site Selection and Design**
   
   Site: ___________________________    Clay Soils?: Yes or No
   
   Fill area location: ___________________________________________________
   
   Water source nearby? Yes or No
   
   - Design
   - Plant List
   - Supply List

4. **Supply Order**
   
   - Order compost, mulch, grass seed and soil erosion blanket
   - Coordinate additional tools: hose, water key, shovels, gloves, rototiller, rakes, wheelbarrows, buckets, etc.

   Contact person for delivery: ____________________________________________
   
   Location for delivery: ________________________________________________
   
   Plants will likely need to be cared for between the time of delivery and the planting day.

   Plant caretaker and day of transporter: _________________________________

5. **Digging Workday**
   
   - Before workday, stake out shape of rain garden with small stakes and string or flour.
   - Recruit 20 adult volunteers for 3 hours. Set a rain date.

   Date and time: _______________________________________________________
   
   Volunteer coordinator: ________________________________________________
   
   School waiver of liability? Yes or No

   Digging Workday Tasks:
   
   - Remove turf grass and set to the side
   - Dig rain garden shape at a depth of 5-8 inches
   - Move extra dirt to create berm or to fill site
• Spread 2 inches of compost into rain garden and rototill
• Transplant turf grass on top of fill dirt and/or scatter grass seed over bare dirt. If using seed, spread soil erosion fabric over fill dirt and secure with wooden stakes.

6. **Planting Workday**

Two – three classrooms of about 25 students will be needed to plant if they each spend one hour working. Before the students arrive, use string and stakes to rope off areas where each species will be planted.

Classroom coordinator: __________________________________________

☐ Recruit 3 or 4 adults to lead smaller groups of students: mulchers, plant preparers, planters and waterers

Planting Workday Tasks:
• Fill buckets and wheelbarrows with mulch and spread throughout the rain garden at a depth of 2-4 inches.
• Some students can prepare the plant plugs by gently pulling them out of their trays and loosening the roots. They can then bring the plants to those digging holes within the rain garden.
• Some students will have small hand trowels which they will use to dig holes (about 6 inches deep) and then plant the plants. After the plant is in the hole, they need to put all the loose soil that was removed back into the hole and press down on the dirt so there aren’t any air bubbles around the plant roots.
• A few students can water the newly planted plugs.

7. **Ongoing Maintenance**

☐ Recruit parents, neighbors or staff to adopt the rain garden and provide regular maintenance during the growing season

☐ Organize a spring and/or fall workday with students

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**Tools**
- Tape Measure
- Line Level
- String
- Wood stakes
- Shovels
- Rakes
- Trowels
- Rototiller
- Wheelbarrows

**Supplies**
- compost & mulch
- plants
- turf grass seed
- soil erosion blanket
1) The garden must be at least 10 feet away from any building to prevent potential water seepage into the basement.

2) Select a naturally low spot that is flat or gently sloping and is downhill of the downspout. Avoid tree roots. Make sure overflow from the garden will go to a safe location, away from a building.

3) Do not place a rain garden over a septic tank, leach field or drinking water well.

4) Call Miss Dig at 811 at least three days before digging to avoid public pipes & utilities.

5) Avoid any private wiring or utilities such as driveway lights, sheds with electricity or lawn irrigation pipes.

Now that you have chosen a general location for the future rain garden, create a base plan that has all the elements that are currently on the site. This is so you can draw up a rain garden plan. Include the house, trees, fences, sheds and bed lines that are near the future rain garden in the base plan. Being able to draw the rain garden plan “to scale” on an accurate base plan will help accurately estimate quantities of plants, mulch & compost. It is handy!

1) First start with a piece of graph paper. Each square on the paper might equal one square foot in the real world, depending on the size of your site. Make sure your graph paper is big enough to include your rain garden’s location. To do that, go outside and measure the space. Count the number of squares across your paper and make sure the plan will fit on the paper.

2) Measure the distance between two fixed spots. (Often, this is two corners of the house.) Draw them, on the graph paper to scale.

3) Start locating other objects in the yard (trees, fences, etc.) To do this, measure the difference between all the fixed spots. Sketch them in on the plan in an approximate location, and write down the distances to each of the fixed spots. For example, A=44’7”; B=28’2”.

4) Go back inside and using a string or compass that is measured to length, triangulate the exact location of the objects on the plan. Use the graph paper squares to make the string the first length that you measured (A). Holding one end of the string on the first fixed spot, draw a semi-circle with the other end. Make the string the distance to the other fixed spot (F1). Holding one end of the string at the other fixed spot (F2), draw a semi-circle that crosses the first. Where the two circles cross is the location of the object. Erase the approximate location, and re-draw it in the exact location.

5. Repeat this process for fence ends, trees or other objects that will affect the location of the rain garden. Sketch in the approximate location of the future rain garden too. Now you have a base plan on which to draw the shape of the rain garden.

1) Measure the length and width of the impervious surfaces (roof or driveway) that will flow to your rain garden. Multiply length times width to find the area in square feet.

2) Design the garden to be 3-6" deep and 20-40% the size of the impervious surfaces.

3) To figure out the exact size of your rain garden, first test your soil permeability by digging a hole that is the width of your shovel and 18" deep. Fill with water, wait until dry. Fill the hole again with water and time the rate of infiltration.

4) If your hole drains within 24 hours, then you will want your rain garden to be 20% the size of your hard surfaces and the depth to be between 4 and 6 inches. If the hole takes longer than 24 hours to drain, size it at 40% your impermeable surface area and a depth of 3".

5) Multiply the total area of impervious surfaces by 0.2 to find the area needed for a rain garden. If your hole takes longer than 24 hours to drain, then multiply by 0.4 to find the area needed for your rain garden.

<table>
<thead>
<tr>
<th>Time to Drain</th>
<th>Impermeable Multiplier</th>
<th>Depth in inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>within 24 hours</td>
<td>0.2</td>
<td>4-6</td>
</tr>
<tr>
<td>longer than 24 hours</td>
<td>0.4</td>
<td>3</td>
</tr>
</tbody>
</table>

Example
If impermeable surface draining into my rain garden is 750ft² and my test hole drains within 24 hours

\[750 \times 0.2 = 150\text{ft}^2\]

My rain garden must be at least 150ft² & 4-6" deep. The dimensions could be 15'x10' or 5'x30'.

If there isn’t enough space on your property for the needed area, or if long term maintenance isn’t possible in such a large garden, it is acceptable to make the rain garden smaller.

6) Select a rainwater overflow outlet location for when the garden fills up and spills over. Make sure it flows away from any buildings and to a safe place.

You will have to dig your garden two inches deeper than the final elevation to allow for added compost.
With an Underground Pipe
Sometimes it is necessary to direct water to the rain garden underground with a pipe.

1) Make sure to place the pipe at or above the top of the lower berm so that water won't sit in the pipe.

2) Use a non-perforated pipe with a 4” diameter to prevent clogging and keep up with heavier rains. The end of the pipe can end with a grate (shown) or with a pop-up.

3) Place a few stones where the pipe outlets in the garden to reduce erosion.

Over Land
Water will run overland to your rain garden if a downhill channel has been created from your downspout to your rain garden.

1) Often water will infiltrate into the ground while moving along the channel. Your drainage channel can be made of stones, native plants or simply be a lowered grassy pathway.

2) Be careful when mowing near your channel.
These are the top twenty native Michigan plants used successfully in Washtenaw County rain gardens. The first two rows (in blue) should be planted on the sides of your rain garden, where it is the most dry. The bottom three rows (in green) should be planted on the bottom of your rain garden, where it is the most wet.

**RECOMMENDED NATIVE PLANTS**

- **New England aster** - Aster novae-angliae
  - Blooms: September - October
- **Canada anemone** - Anemone canadensis
  - Blooms: May - June
- **Wild geranium** - Geranium maculatum
  - Blooms: May - June
- **Goldstrum black-eyed susan** - Rudbeckia fulgida
  - Blooms: July - September

- **Ninebark** - Physocarpus opulifolius
  - Blooms: May - July
- **Redbud** - Cercis canadensis
  - Blooms: May
- **Wild strawberry** - Fragaria virginiana
  - Blooms: May - June
- **Kobold blazing star** - Liatris spicata
  - Blooms: July

- **Purple coneflower** - Echinacea purpurea
  - Blooms: July - August
- **Switch grass** - Panicum virgatum
  - Blooms: September - October
- **Nodding wild onion** - Allium cernuum
  - Blooms: May - June
- **Ostrich fern** - Matteuccia struthiopteris
  - Blooms: July - August

- **Goldfinger potentilla** - Potentilla fruticosa
  - Blooms: June - July
- **Fox sedge** - Carex vulpinoides
  - Blooms: May - June
- **Red-osier dogwood** - Geranium maculatum
  - Blooms: August - September
- **Rose Mallow** - Hibiscus moscheutos
  - Blooms: May - June

- **Pink turtlehead** - Chelone lyonii
  - Blooms: August - September
- **Sensitive fern** - Onoclea sensibilis
  - Blooms: May - June
- **Blue lobelia** - Lobelia siphilitica
  - Blooms: July - September
- **Blue flag iris** - Iris virginica
  - Blooms: May - June

**Legend**
- ☀️ full sun
- 🌿 part sun
- ⚠️ aggressive spreader
You will dig the rain garden 2 inches deeper than the final intended depth. You will then add 2 inches of compost on the rain garden bottom & sides. You will cover that with 2 to 4 inches of hardwood shredded mulch.

Determine how much compost and mulch is required to cover the garden with the following calculation:

\[(A \times 0.00617) = \text{material in cubic yards}\]

where \(A = \text{area in square feet of garden}\)

Area can be calculated by counting the squares on your base plan drawing. Calculation can be used for either compost or mulch material and is only for depths of 2”.

For a 400 square foot rain garden:

\[400 \times 0.00617 = 2.5 \text{ cubic yards of compost (spread 2” thick)}\]

I typically spread 2 inches of compost, but 4 inches of mulch so I will need 2.5 cubic yards of compost and 5 cubic yards of mulch.
1) Use the base plan you made to draw in the rain garden outline. Draw in the berm, if you are digging on a slope, on the downslope sides (see page 23 for more information). The berm can take up a surprising amount of room, especially on steeper sites. Make sure you will only be changing the grade of your property, not the grade of your neighbor’s property.

2) Make sure there is at least ten feet of distance between any structure with a basement to the rain garden to prevent water damage. Generally, the rain garden should be at least 2 feet away from the property line and shouldn’t negatively impact your neighbor’s property.

3) Make the garden a pleasing shape that goes with the rest of the garden.

4) Decide the form of water conveyance to the rain garden: overland swale or underground. Record the path and type of conveyance on the drawing.

5) Select plants. Plants for the sides and bottom of the rain garden should include those adapted to the extremes of wet and dry conditions. The berm should include plants adapted to dry conditions. See the suggested plant list on page 25.

6) Incorporate a diverse mix of sedges, rushes and grasses with your flowering plants. Consider the height, bloom time, sun requirements and color to create a varied garden.

7) Defined edges make a naturalized area look more deliberate. Label plants to ease identification during weeding.
Sample: sun
Miller Ave Rain Garden

Purple Coneflower
Echinacea purpurea

Feather Reed Grass
Calamagrostis acutiflora

Autumn Joy Sedum
Sedum x ‘Autumn Joy’

Hyperion Daylily
Hemerocallis ‘Hyperion’

Sample: shade
Residential Rain Garden

Blue Flag Iris
Iris virginica

Cardinal Flower
Lobelia cardinalis

Switchgrass
Panicum virgatum

Wild Geranium
Geranium maculatum
Holmes Elementary School Rain Garden Design

1. Black-Eyed Susan, *Rudbeckia fulgida*  
   - Color: yellow  
   - Bloom Time: fall  
   - Spacing: 12"  
   - No: 38 plugs

2. Blue Flag Iris, *Iris virginica*  
   - Color: blue  
   - Bloom Time: spring  
   - Spacing: 18"  
   - No: 31 plugs

3. Canada Anemone, *Anemone canadensis*  
   - Color: white  
   - Bloom Time: spring  
   - Spacing: 18"  
   - No: 38 plugs

4. Culver’s Root, *Veronicastrum virginicum*  
   - Color: white  
   - Bloom Time: summer  
   - Spacing: 12"  
   - No: 38 plugs

5. Foxtail Grass, *Carex vulpinoides*  
   - Color: green  
   - Bloom Time: spring  
   - Spacing: 18"  
   - No: 38 plugs

6. Wild Geranium, *Geranium maculatum*  
   - Color: lavender  
   - Bloom Time: spring  
   - Spacing: 12"  
   - No: 38 plugs

7. Wild Strawberry, *Fragaria virginiana*  
   - Color: white  
   - Bloom Time: summer  
   - Spacing: 12"  
   - No: 38 plugs

Additional Supplies

<table>
<thead>
<tr>
<th>Area</th>
<th>Units</th>
<th>Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain Garden</td>
<td>400 SF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mulch (4&quot; deep)</td>
<td>5 CY</td>
<td>$45/CY</td>
<td>$225</td>
</tr>
<tr>
<td>Compost (2&quot; deep)</td>
<td>2.5 CY</td>
<td>$37/CY</td>
<td>$83.75</td>
</tr>
<tr>
<td>Plant labels (25-pack)</td>
<td></td>
<td>$2/label</td>
<td>$20</td>
</tr>
</tbody>
</table>

Draft design for Holmes Elementary, prepared by partner organization the Water Resources Commissioner’s Office. Costs from local plant producer, WildType. Species were chosen to maximize bloom time, to be short for visibility and to provide wildlife habitat.
Sample Design: part sun
Summers Knoll Schoolyard Rain Garden, Ann Arbor Michigan

Summers-Knoll School
Rain Garden Design

Draft design prepared by partner organization the Water Resources Commissioner's Office. Costs from local plant producer, WildType. Species were chosen for the following reasons:
- to maximize bloom time when school is in session
- to provide varied texture, especially for special education students
- to provide good habitat for butterflies and other species
- to match site conditions for soil (B), light (part sun), & local SE Michigan conditions

### Planting Plan

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Color</th>
<th>Bloom Time</th>
<th>Space</th>
<th>Cost</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue flag iris, Iris virginica</td>
<td>blue</td>
<td>spring</td>
<td>18”</td>
<td>$47.50/38</td>
<td>38</td>
<td>$47.50</td>
</tr>
<tr>
<td>Blue lobelia, Lobelia siphilitica</td>
<td>blue</td>
<td>fall</td>
<td>12”</td>
<td>$47.50/38</td>
<td>38</td>
<td>$47.50</td>
</tr>
<tr>
<td>New England Aster, Aster novaeangliae</td>
<td>purple</td>
<td>fall</td>
<td>18”</td>
<td>$42.56/38</td>
<td>38</td>
<td>$42.56</td>
</tr>
<tr>
<td>Obedient plant, Physostegia virginiana</td>
<td>pink</td>
<td>late summer</td>
<td>18”</td>
<td>$47.50/38</td>
<td>38</td>
<td>$47.50</td>
</tr>
<tr>
<td>Porcupine sedge, Carex hysterocarpa</td>
<td>n/a</td>
<td>n/a</td>
<td>18”</td>
<td>$42.56/38</td>
<td>38</td>
<td>$42.56</td>
</tr>
<tr>
<td>Wild geranium, Geranium maculatum</td>
<td>purple</td>
<td>spring</td>
<td>12”</td>
<td>$76/38</td>
<td>38</td>
<td>$76</td>
</tr>
<tr>
<td>Wild strawberry, Fragaria virginiana</td>
<td>white</td>
<td>spring</td>
<td>12”</td>
<td>$47.50/38</td>
<td>38</td>
<td>$47.50</td>
</tr>
</tbody>
</table>

**TOTAL $351.12**

### Additional Supplies

<table>
<thead>
<tr>
<th>Area</th>
<th>Units</th>
<th>Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain Garden</td>
<td>400 SF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mulch (4” deep)</td>
<td>5 CY</td>
<td>$18/CY</td>
<td>$90</td>
</tr>
<tr>
<td>Topsoil (2” deep)</td>
<td>2.5 CY</td>
<td>$18/CY</td>
<td>$45</td>
</tr>
<tr>
<td>Delivery Fee</td>
<td></td>
<td>$65</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL $200**

**Total Cost: $551.12**
PART 2: SCHOOLYARD RAIN GARDEN LESSONS

second graders from Cornerstone Elementary present their rain garden designs
Stormwater and the Water Cycle Lesson Plan
Created by the Washtenaw County Water Resources Commissioner’s Office with funding in part from the Community Foundation for Southeast Michigan

SUPPLIES
- The Puddle Garden by Jared Rosenbaum
- Use worksheet one for grades 2-4th and two for 5 and 6th
- Game dice, taped together or taped onto wooden blocks
- Labels for each station

BACKGROUND
- Read the book, The Puddle Garden and then talk about how rain gardens create a home for plants and animals. They also help stop puddling because they hold stormwater in place so it can go down into the soil, or up into plants
- Draw parts of the water cycle on the board (see example on next page) and talk about how water moves through each part: cloud, Bird Hills, Huron River, rain garden, plant, animal, groundwater. Explain groundwater in depth, and make sure to say water that travels through the ground gets cleaned.

WATER CYCLE GAME
Place each station label and dice on desks around the room. Note the small corner label on each dice, ie: “1. drain” is round one, drain station.

Rules
Each student is a droplet of water, working in groups of two or three. There are two rounds and during each round you will visit 8 stations. You’ll start at the station that I send you to. First write your names and the name of your station on your paper. Then roll the dice at your station and read what it says. Follow the dice’s directions to go to the next station. Write down that station on your paper, and all the next stations that you visit. Demo a few rounds. Then send the students in groups to different stations.

Round One
- After they have completed round one, have them all come back to the carpet and share. Use all of their water cycle journeys to draw arrows and show one water cycle on the board. Prompt- raise your hand if you went to the cloud. Tell me, where did you go next? (mountain) Raise your hand if you went to the mountain. Where did you go next?
- Ask where they went after they landed in the stormdrain (only to the river). Have one student get the stormdrain dice and read all of the sides, which will all say Huron River. Why did I make that dice say only Huron River? Because all water that lands in the drain flows directly into the river which hurts the fish and other animals.
- Prompt- how can we stop water from rushing into the stormdrain? By building a rain garden (which they learned from the book). Brainstorm ideas of why rain gardens might be helpful?
- Draw in a rain garden, then say that in round two we will replace the stormdrain with a rain garden. Have the students help exchange the dice for round two, and change the rain garden sign to a stormdrain sign. Play round 2!

Round Two
- After round two draw a second water cycle journey like you did for round one. Ask the class where they went when they landed in the storm drain (river). Ask them where they went when they landed in the rain garden during round two. Many options: bird, plant, cloud, groundwater.
- Do you think that is a good thing? Why?
- Is it better for raindrops to land in rain gardens or in stormdrains? Why and why not?
- Have students answer the three questions at the bottom of their worksheet. When discussing the last question, take home messages include:

Rain gardens help stop puddling, make a home for plants and animals, and let water get cleaned up by going into the ground.

Stromdrains help stop flooding, but they stop the water droplets from going through the whole water cycle which means animals and plants can’t use it.

OBJECTIVE
Learn the role of stormwater and rain gardens in the water cycle

GRADE LEVEL (GL)
2nd through 6th grade

For information on the Schoolyard Rain Garden Program contact Catie | wytychakc@ewashtenaw.org | (734) 222-6813
CONTAMINATION ADDITION

ADDITIONAL SUPPLIES
- Small pieces of colored paper cut into 1/2 inch squares. Cut about 100 pieces of red and 100 pieces of yellow
- Use worksheet two

ADDITIONAL RULES
- Explain the additional rules of the game. Say there is an e-coli spill in the stormdrain for round one and the rain garden for round two (from a raccoon family!). There is a sediment spill (erosion from wind/water makes dirt come loose) on Bird Hills. Drop colored papers at each station. Red can be e-coli and yellow can be sediment. Each group will take 8 sediment particles (yellow) and/or 8 e-coli particles (red) when you arrive at the spill site and drop two off at the next 4 stations. If you have any left when your round is finished, leave them all at the last station.

Round One
- During each round, the facilitator should pick up all contaminants in the groundwater station because they are being 'cleaned' out by microbes
- After round one, talk about how important this is for keeping our water clean
- Have a student count up the number of contaminants in the river and record it on the board. Students should also record it on their worksheets

Round Two
- Prompt- do you think there will be more contaminants overall in the first round or the second round?
- There should be less contamination in the river after the second round because the rain garden is allowing stormwater to infiltrate into the ground where it will get cleaned up

OBJECTIVE
Learn the role of stormwater and rain gardens in the water cycle. Learn how pollution can move through the water cycle.

GRADE LEVEL (GL)
5th and 6th grade

For information on the Schoolyard Rain Garden Program contact Catie | wytychakc@ewashtenaw.org | (734) 222-6813
You are a droplet of water! Start at one of the stations posted around the room. Write down what station you are at on the first line below. Roll the dice at your station. Follow the directions to know what station to go to next. Write down each station that you visit in the lines below. For round one, once you have gone to 8 stations, sit down. As a class, we will record one water cycle. We will then play round two the same way.

### Round 1:
1. __________________________
2. __________________________
3. __________________________
4. __________________________
5. __________________________
6. __________________________
7. __________________________
8. __________________________

### Round 2:
1. __________________________
2. __________________________
3. __________________________
4. __________________________
5. __________________________
6. __________________________
7. __________________________
8. __________________________

As a class, we will discuss the following questions. Write down your answers.

1. In Round 1, where did you go when you landed in the stormdrain?

   __________________________________________

2. In Round 2, where did you go when you landed in the rain garden?

   __________________________________________
   __________________________________________
   __________________________________________

3. As a rain drop, would you rather land in a stormdrain or in a rain garden? Why?

   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

---

For information on the Schoolyard Rain Garden Program contact Catie | wytychakc@ewashtenaw.org | (734) 222-6813
You are a droplet of water! Start at one of the stations posted around the room. Write down what station you are at on the first line below. Roll the dice at your station. Follow the directions to know what station to go to next. Write down each station that you visit in the lines below. Pick up 8 sediment particles (red) and/or 8 E Coli particles (yellow) when you arrive at the spill and drop two off at the next 4 stations. If you have any left after 8 rounds, leave them all at the last station. Once you have completed your first round, sit down. As a class, we will record the number of E Coli and sediment for each round.

### Round 1:
1. ___________________________
2. ___________________________
3. ___________________________
4. ___________________________
5. ___________________________
6. ___________________________
7. ___________________________
8. ___________________________

Huron River e-coli _______
sediment _______

### Round 2:
1. ___________________________
2. ___________________________
3. ___________________________
4. ___________________________
5. ___________________________
6. ___________________________
7. ___________________________
8. ___________________________

Huron River e-coli _______
sediment _______

### Discussion Questions:

1. In Round 1, where did you go when you landed in the stormdrain? Why is that?  
   ___________________________

2. In Round 2, where did you go when you landed in the rain garden?  
   ___________________________

3. As a rain drop, would you rather land in a stormdrain or in a rain garden? Why?  
   ___________________________

4. Did the amounts of e-coli and sediment in the Huron River change between the rounds? Why do you think that is?  
   ___________________________

For information on the Schoolyard Rain Garden Program contact Catie | wytychakc@ewashtenaw.org | (734) 222-6813
Design a Rain Garden Lesson Plan
Created by the Washtenaw County Water Resources Commissioner's Office with funding in part from the Community Foundation for Southeast Michigan

SUPPLIES
- Teenage Rain Drop comic strip by David Zinn
- Use worksheet one for 2-5th grades and worksheet two for 6th grade

BACKGROUND
- Read a Teenage Rain Drop and talk about how a rain garden will help clean stormwater, reduce puddling and helps the animals and plants.
- Draw a rain garden on the whiteboard and talk about the structure of a garden. Main components are the garden is bowl shaped to hold water and has a layer of compost and mulch at the bottom. It helps the animals and plants.

OBJECTIVE
Learn how rain gardens work and how to design one for 6th grade

GRADE LEVEL (GL)
2nd through 6th grade

ADDITIONAL COMPONENTS
Follow directions on the worksheet to have students figure out the site characteristics based on the aerial image

6th GRADE ADDITION
- Use worksheet one for 2-5th grades and worksheet two for 6th grade
- Use aerial map of house and yard, include contour lines, soil type, square footage of roof, map washtenaw.org

PRESENT
Invite a few students to present their rain garden designs in front of the class in the last 5-10 minutes of class.

DESIGN LESSON

Choose and draw the plants

Draw a Rain Garden Shape
- The first step is to draw a rain garden shape from a bird’s eye view. It can be any shape.
- Use the “Recommended Native Plants” page and code each species on the worksheet so anyone looking at your design will know what each color represents.

Draw a Rain Garden Shape
- Draw a rain garden from a bird’s eye view. It can be any shape. Then find the length and the width of the widest and longest part of the rain garden by counting the squares on the graph paper (1 square = 1 foot). This is helpful for when you build the rain garden outside.

Objectives:
Learn how rain gardens work and how to design one
Create a Rain Garden Lesson Plan

For information on the Schoolyard Rain Garden Program contact Catie: wytychakc@ewashtenaw.org | (734) 222-6813

Southeast Michigan Created by the Washtenaw County Water Resources Commissioner’s Office with funding in part from the Community Foundation for
Name: _____________________________________

1. Draw a rain garden shape. One square = 1 square foot.
   How wide is your rain garden?   _________ feet
   How long is the rain garden?   _________ feet

2. Select the plants from the Native Plants page. Choose plants with a variety of color, bloom time and animal companions.

3. Draw your plants into your rain garden. Note how tall your plant is. If your plant is one foot tall, then draw your plant as a circle that covers about 1 square foot (one box).

4. How many plants will you need? Count the number of each plant species and write it down below. Label each plant by color.
   Plant Name
   Number
   Color

   Total Number of Plants: ____________

<table>
<thead>
<tr>
<th>Number</th>
<th>Plant Name</th>
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</tbody>
</table>

   Design a Rain Garden
   worksheet
   one

   Community Foundation for Southeast Michigan
   Resources Commission's Office with funding in part from the Community Foundation for Southeast Michigan

   GL 2.3

   Schoolyard Rain Gardens | wytychakc@ewashtenaw.org | (734) 222-6813
<table>
<thead>
<tr>
<th>1 foot tall:</th>
<th>Canada anemone</th>
<th>Wild geranium</th>
<th>Nodding wild onion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Anemone canadensis</em></td>
<td><em>Geranium morumbetum</em></td>
<td><em>Allium cernuum</em></td>
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<tr>
<td></td>
<td>No bloom</td>
<td>Spring</td>
<td>Fall</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Fragaria virginiana</em></td>
<td><em>Chelone lyonii</em></td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>Spring</td>
<td>Summer</td>
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<td></td>
<td>1 foot tall</td>
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</tbody>
</table>
1. Draw a rain garden shape. One square = 1 square foot.

   How wide is your rain garden? _________ feet

   How long is the rain garden? _________ feet

2. Select the plants from the Native Plants page. Choose plants with a variety of color, bloom time and animal companions.

3. Draw your plants into your rain garden. Note how much space each plant needs. If it says 1.5 feet on center then there should be 1.5 feet between the center of your plant and the center of the next closest plant. Draw plants as circles and use the grid lines to guide you.

4. How many plants will you need? Count the number of each plant species and write it down below. Label each plant by their color. _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ 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RECOMMENDED NATIVE PLANTS

These are the top native Michigan plants used successfully in Washtenaw County rain gardens.

GL 4-5

1 foot on center:

Canada anemone | Anemone canadensis
---|---
Spring | 1 foot tall | 1 foot on center

Wild strawberry | Fragaria virginiana
---|---
Spring | 1 foot tall | 1 foot on center

Nodding wild onion | Allium cernuum
---|---
Fall | 1 foot tall | 1 foot on center

2 feet on center:

Blue flag iris | Iris virginica
---|---
Spring | 2 feet tall | 2 feet on center

Wild geranium | Geranium maculatum
---|---
Summer | 1 foot tall | 2 feet on center

Black-eyed susan | Rudbeckia fulgida
---|---
Fall | 2 feet tall | 2 foot on center

Sensitive fern | Onoclea sensibilis
---|---
No bloom | 2 feet tall | 2 foot on center

Pink turtlehead | Chelone lyonii
---|---
Fall | 3 feet tall | 2 feet on center

Purple coneflower | Echinacea purpurea
---|---
Fall | 3 feet tall | 2 feet on center

3 feet on center:

Rose Mallow | Hibiscus moscherus
---|---
Fall | 5 feet tall | 3 feet on center

Switch grass | Panicum virgatum
---|---
Summer | 5 feet tall | 3 feet on center

Goldfinger potentilla | Potentilla fruticosa
---|---
Summer | 4 feet tall | 3 feet on center
Design a Rain Garden worksheet two

Created by the Washtenaw County Water Resources Commissioner’s Office with funding in part from the Community Foundation for Southeast Michigan

1. Determine your site characteristics based on the aerial map that you received. Look for nearby trees or buildings to find sun level.

   Sun level: ___________ (sun, part sun, etc)

   Soil type: ___________ (clay, loam, sand)

2. Decide where your rain garden should be located on the map. Make sure all buildings are farther than 10 feet from your rain garden and that you maximize the amount of water that will flow into the rain garden.

3. Calculate the size that your rain garden should be. If you have loam or sand soils, the rain garden should be 20% the size of the area draining into the garden (multiply by 0.2). If you have clay soils, the rain garden should be 40% the size of the area draining into the garden (multiply by 0.4). If you have clay soil or sand soils, the rain garden should be 20% the size of the area draining into the garden (multiply by 0.2).

   Area draining into the rain garden: ________ square feet

   Area of rain garden: ________ square feet

4. Select your plants. Choose plants that will work for the sun level and soil type and have a variety of bloom times, heights and animal companions. Note how much space each plant needs. If you have clay soil, make sure the root zone is 1 square foot if your garden is 400 square feet. If you have loam soil, make sure the root zone is 1 square foot if your garden is 400 square feet. Draw your plants to scale. The shape of the garden is up to you.

   The shape of the garden should be 400 square feet if your rain garden is 400 square feet. The shape of the garden should be 20% the size of the area draining into the garden (multiply by 0.4).

   Plant Name, ie: Canada anemone
   Color

   Soil type: ___________ (clay, loam, sand)

   Sun level: ___________ (full sun, part sun)

   Number of plants: ____________

5. How many plants will you need? Count the number of each plant species and write it down below. Label each plant by their color.

   Plant Name: ___________
   Number of plants: ____________

   Color: ____________

   Soil type: ___________ (clay, loam, sand)

   Sun level: ___________ (full sun, part sun)

   Total Number of Plants: ____________

6. How much will your rain garden cost? If plants cost $2 each, how much will your rain garden cost?

   Total Cost of Plants: ____________________

   Total Cost of Plants: ____________________

7. Draw your rain garden on graph paper and any nearby features, like sidewalks or buildings. Draw your garden to scale. The shape of the garden is up to you. If your garden is 400 square feet, there should be 400 squares in your rain garden. The shape of the garden is up to you.

   Area of rain garden: ________ square feet

   Area draining into rain garden: ________ square feet

   Total Number of Plants: ____________

8. Select your plants. Choose plants that will work for the sun level and soil type and have a variety of bloom times, heights and animal companions. Note how much space each plant needs. If you have clay soil, make sure the root zone is 1 square foot if your garden is 400 square feet. If you have loam soil, make sure the root zone is 1 square foot if your garden is 400 square feet.

   Plant Name, ie: Canada anemone
   Color

   Soil type: ___________ (clay, loam, sand)

   Sun level: ___________ (full sun, part sun)

   Number of plants: ____________

   Color: ____________

   Soil type: ___________ (clay, loam, sand)

   Sun level: ___________ (full sun, part sun)

   Total Number of Plants: ____________

9. Draw your rain garden on graph paper and any nearby features, like sidewalks or buildings. Draw your garden to scale. The shape of the garden is up to you. If your garden is 400 square feet, there should be 400 squares in your rain garden. The shape of the garden is up to you.

   Area of rain garden: ________ square feet

   Area draining into rain garden: ________ square feet

   Total Number of Plants: ____________

10. Select your plants. Choose plants that will work for the sun level and soil type and have a variety of bloom times, heights and animal companions. Note how much space each plant needs. If you have clay soil, make sure the root zone is 1 square foot if your garden is 400 square feet. If you have loam soil, make sure the root zone is 1 square foot if your garden is 400 square feet.

   Plant Name, ie: Canada anemone
   Color

   Soil type: ___________ (clay, loam, sand)

   Sun level: ___________ (full sun, part sun)

   Number of plants: ____________

   Color: ____________

   Soil type: ___________ (clay, loam, sand)

   Sun level: ___________ (full sun, part sun)

   Total Number of Plants: ____________

11. Draw your rain garden on graph paper and any nearby features, like sidewalks or buildings. Draw your garden to scale. The shape of the garden is up to you. If your garden is 400 square feet, there should be 400 squares in your rain garden. The shape of the garden is up to you.

   Area of rain garden: ________ square feet

   Area draining into rain garden: ________ square feet

   Total Number of Plants: ____________

12. Select your plants. Choose plants that will work for the sun level and soil type and have a variety of bloom times, heights and animal companions. Note how much space each plant needs. If you have clay soil, make sure the root zone is 1 square foot if your garden is 400 square feet. If you have loam soil, make sure the root zone is 1 square foot if your garden is 400 square feet.

   Plant Name, ie: Canada anemone
   Color

   Soil type: ___________ (clay, loam, sand)

   Sun level: ___________ (full sun, part sun)

   Number of plants: ____________

   Color: ____________

   Soil type: ___________ (clay, loam, sand)

   Sun level: ___________ (full sun, part sun)

   Total Number of Plants: ____________

13. Draw your rain garden on graph paper and any nearby features, like sidewalks or buildings. Draw your garden to scale. The shape of the garden is up to you. If your garden is 400 square feet, there should be 400 squares in your rain garden. The shape of the garden is up to you.

   Area of rain garden: ________ square feet

   Area draining into rain garden: ________ square feet

   Total Number of Plants: ____________

14. Select your plants. Choose plants that will work for the sun level and soil type and have a variety of bloom times, heights and animal companions. Note how much space each plant needs. If you have clay soil, make sure the root zone is 1 square foot if your garden is 400 square feet. If you have loam soil, make sure the root zone is 1 square foot if your garden is 400 square feet.

   Plant Name, ie: Canada anemone
   Color

   Soil type: ___________ (clay, loam, sand)

   Sun level: ___________ (full sun, part sun)

   Number of plants: ____________

   Color: ____________

   Soil type: ___________ (clay, loam, sand)

   Sun level: ___________ (full sun, part sun)

   Total Number of Plants: ____________

15. Draw your rain garden on graph paper and any nearby features, like sidewalks or buildings. Draw your garden to scale. The shape of the garden is up to you. If your garden is 400 square feet, there should be 400 squares in your rain garden. The shape of the garden is up to you.

   Area of rain garden: ________ square feet

   Area draining into rain garden: ________ square feet

   Total Number of Plants: ____________
These are the top native Michigan plants used successfully in Washtenaw County rain gardens.

RECOMMENDED NATIVE PLANTS

1 foot on center:
- Canada anemone (sun, part sun, shade)
- Sensitive fern (sun, part sun, shade)
- Nodding wild onion (sun, part sun)

2 feet on center:
- Wild strawberry (sun, part sun, shade)
- Fox sedge (sun, part sun, shade)
- Black-eyed susan (sun, part sun)

3 feet on center:
- Wild geranium (sun, part sun, shade)
- Pink turtlehead (sun, part sun)
- Purple coneflower (sun, part sun)

Blue lobelia (sun, part sun, shade)
- Blue flag iris (sun, part sun, shade)
- Goldfinger potentilla (sun)

Rose Mallow (sun)
- Switch grass (sun)
- Redbud Tree (sun, part sun, shade)

Bransford, W.D. and Dolphia

LBJ wildflower center

May - June | 1 foot tall | 1 foot on center
No bloom | 2 feet tall | 1 foot on center

May - June | 2 feet tall | 1 foot on center
July - Sept | 2 feet tall | 1 foot on center

May - June | 2 feet tall | 1 foot on center
August - Sept | 3 feet tall | 2 feet on center

July - Sep | 2 feet tall | 2 foot on center
May - June | 2 feet tall | 2 feet on center

August - Sept | 5 feet tall | 3 feet on center
Aug-Sept | 5 feet tall | 3 feet on center

May | 25 feet tall | 20 feet on center

GL 6

Schoolyard Rain Gardens | wytychakc@ewashtenaw.org | (734) 222-6813

29
This map is not to be used for navigation.

The map is a user-generated diagram from an internet mapping site and

3000 SQUARE FEET

Clague Middle School

Legend

Names: ____________________________________________ Date: ___________________
SUPPLIES
- Colored pencils or markers
- Worksheet
- Pencil or pen

BACKGROUND
- Students will answer the following questions on the worksheet and draw a side view diagram of a rain garden. Draw an example diagram, like on worksheet 1. Include labels for compost, mulch, plants and anything else that is included, like roots, animals, bees, etc.
- Brainstorm the answers to the following questions:

1) What is a rain garden?
   - Focus on the physical qualities of a rain garden - it is bowl shaped so that it can capture and store stormwater
   - The garden has a flat bottom so that water can soak in evenly throughout the garden
   - There is a layer of compost (2 inches) and mulch (4 inches)
   - The whole garden is full of native plants with deep roots

2) Why are rain gardens important?
   - Clean Water
     - Rain gardens capture and store stormwater which slows the water down and lets it soak into the ground
     - When stormwater soaks into the ground, it gets cleaned up. Stormwater is usually full of pollutants like fertilizers, pesticides, oil, sediment, etc which it picks up as it moves along hard surfaces like roads and parking lots
     - Stormwater gets clean because the soil below us is like a natural filter. There are micro-organisms in the soil that break down the pollutants
     - Without rain gardens the dirty stormwater would usually go into the stormdrain and directly to the river, without ever being filtered. This can hurt the animals who live in the rivers, and us!
   - Habitat
     - Rain gardens are also full of native plants so are good habitat for birds, bees, insects, frogs, etc.
   - Reduce Puddling
     - Rain gardens hold stormwater in one place so they can reduce puddling in or around the home

3) How can we care for our rain garden?
   - Water during the first summer
   - Weed regularly and remove trash
   - Don’t step on the plants
   - Trim back plants in the winter

- Take the best factsheets and photocopy them for the school’s staff so that they know what the new rain garden is all about!
Schoolyard Rain Garden

The schoolyard rain garden project was coordinated by the Water Resources Commissioner’s Office and funded by the Community Foundation for Southeast Michigan. For more information or to volunteer, contact Catie Wytychak at (734) 222-6813 or wytychakc@washtenaw.org.
PART 3: BUILDING A RAIN GARDEN

Digging demonstration at Summers-Knoll School, Spring 2017
1) Translate the dimensions of your rain garden onto the ground by first laying out tape measures that act like the grid paper

2) Add a flag garden border into the ground in the measured locations from your ‘point of beginning’

3) Define the border with string or spray paint

4) On the planting day, string and stakes can also be used to divide up the rain garden into planting zones. Each class or group could be assigned to plant a certain species within a planting zone.

Students can do this exercise a day in advance to work on graphing and mapping skills.
With a group of 20-30 adults, a 400 square foot rain garden can be hand dug in about 3 hours. Always call Miss Dig two weeks before the workday to make sure there are no underground utilities that could be impacted by digging about 8” deep. Schedule a rain date in case of inclement weather.

1) Remove the turf grass in squares with spades. Place squares directly into a wheelbarrow and then dump them into a pile near a low or bare area of the playground.

2) Dig the rain garden depth down to between 5 and 8 inches, depending on how deep you want water to pool. If you want water to pool at 3 inches (clay soils), then dig 5 inches. Sites with better soils can dig down to a maximum depth of 8 inches, to then have water pool at 6 inches. The bottom of the rain garden should be level. If the garden is on a slope, use the fill dirt to build a berm on the downhill side to hold the water like a bowl. Add a notch to the downslope berm for overflow water to go to a safe location. The notch will determine the water depth within the rain garden.

3) Move the remaining fill dirt into wheelbarrows and then spread it smoothly into low or bare areas of the playground. It is best to first rough up these bare spots with a rototiller or shovel. Lay the turf grass squares on top of the fill dirt, squeezing the squares as close together as possible. If there is bare soil, scatter grass seed and then roll out and pin a soil erosion blanket. Water thoroughly.

4) Use wheelbarrows and rakes to move the compost pile and then spread it smoothly to a depth of 2 inches. Rototill the compost into the native soil until it appears well mixed. If this does not happen then the soil can be too rich and damage the new plants. If topsoil is used, it also must be mixed thoroughly so that the new plant roots don’t become ‘stuck’ in the good soil and never grow into the native soils.

5) If two classes or fewer will be planting the rain garden, have the volunteers spread the mulch over the compost. Use wheelbarrows and rakes to move the mulch pile and then spread it smoothly to a depth of 2 to 4 inches.

### Site Preparation
(for both digging & planting days)
- Design & plant list
- Tape Measure
- Line Level
- String
- Wood stakes

### Digging
- Shovels
- Rakes
- Rototiller
- Wheelbarrows
- Tape Measure
- Line Level
- String
- Wood stakes

### Planting
- Shovels
- Rakes
- Trowels
- Wheelbarrows
- Tape Measure
- String
- Wood stakes
DIGGING ON A SLOPE

1. Start digging here

2. Measure down from the string to make sure the garden bottom is level

3. Underground pipe: bottom of pipe opening must be higher than the notch in berm

Berm: Overflow notch on berm determines water level

Rain Garden water line: 3-6”
During the workday, first divide the students into different groups: plant preparers, planters and mulchers. If you only have two classes, it is better to mulch the rain garden during the digging workday. In this case, students will just plant and water.

**Plant Preparers**- carefully remove plant plug from plastic tray by squeezing around the bottom of the tube and gently pulling at the base of the stem. The tray should be held so that the plant is horizontal to the ground. Break apart the roots of the plant. In some cases, the plant will be so rootbound that you have to use a shovel to break apart the roots. If the roots are not torn apart and loosened, then the plant will not grow new roots when planted in the soil.

**Planters**- dig a hole that is about as deep as the plug. If the garden is already mulched, the mulch will need to be moved to the side into a pile. The soil moved out of the hole will also need to be made into a pile (to be used again). Place the plug upright into the hole. Fill in around the plug with the old soil, pressing down so that the plug is snug. Smooth the mulch around the plug.

**Mulchers**- spread mulch 2-4 inches thick throughout the rain garden. This can be done by all students at the beginning of the workday, or piece by piece by smaller groups each class. I find it easier to spread the mulch and then plant, but some prefer to plant and then spread mulch. Mulch is important in keeping weeds out and keeping water in. Mulch also slowly decomposes and adds nutrients into the soil. This group can also water each plug for about 5 second with a hose.
PART 3: MAINTAINING A RAIN GARDEN

students pulling weeds from a rain garden
**Watering**

- Water over the first summer. If the garden was planted in the spring, water 1-2 times per week for about 1 hour each time (unless it rains) or 1 inch per week.
- If planted in the fall, water 1 inch per week (unless it rains) through late October and in July and August of the following summer.

Test how wet the soil is by putting your pointer finger into the soil past your knuckle. If the soil is moist at that depth, then you don’t need to water. When watering, about 25 gallons of water is needed for each 100 square feet of rain garden. This can change depending on the amount of sunlight received and soil types.

**Transplanting**

- Replant in bare areas as needed. Large plants can be divided and transplanted to fill bare areas. Some plants that can be divided and transplanted include Blue Flag Iris, Canada Anemone, Switchgrass and Wild Strawberry.

When dividing these plants, a shovel can be used to dig up a section of the plant. Include about 6 inches of root and dirt when moving the plant. Dig a new hole for the plant that is large enough for the roots and old dirt. Make sure to press down around the new transplant to reduce the amount of air pockets in the soil.

**Planting**

- Hand trowels
- Gloves
- Wheelbarrows

**Transplanting**

- Shovels
- Gloves
- Wheelbarrows

**Watering**

- Water key
- Hose
- Sprinkler

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Left: UM Ginsberg Center volunteers at Erickson above: Steward Frank planting shrubs at Thurston Elementary School. Photo credit: Linda Prieskorn
Herbaceous plants
colors indicate when plants should be targeted for removal

- **Bull Thistle**: dig out
- **Bittercress**: hand pull
- **Burdock**: dig out
- **Canada Thistle**: hand pull
- **Chicory**: hand pull
- **Crown Vetch**: hand pull/herbicide
- **Curly Dock**: dig out
- **Dandelion**: hand pull
- **Dames Rocket**: hand pull
- **Field Bindweed**: hand pull/herbicide
- **Garlic Mustard**: hand pull
- **Japanese Knotweed**: herbicide
- **Leafy Spurge**: herbicide
- **Narrow-leaved Cat-tail**: herbicide
- **Phragmites**: herbicide
- **Plantain**: hand pull
- **Purple Loosestrife**: herbicide
- **Ragweed**: hand pull
- **Reed Canary Grass**: dig out
- **Teasel**: dig out

- spring
- summer
- fall
- leave to be herbicided by a certified applicator
Woody plants
all woodies should be dug out or cut and herbicided by a certified applicator
Spring- If leaves have accumulated to a depth of more than one foot, then they should be removed so that new plant growth is not suffocated. A controlled burn can be done in early spring, before there is too much green vegetation. This will encourage natives, reduce invasives and eliminate excess leaves.

Late spring is the best time to remove some invasives, see the previous pages for the species labeled in pink. Make sure to remove these invasives before their flowers go to seed and while they are still small.

Mulch can be added to gardens to reduce the amount of weeds. Leaves or cut standing dead vegetation can also be used as a natural (and free) mulch. If a garden is mulched with wood chips, it is not recommended that it be burned for 3 years. When a recently mulched garden is burned, the mulch can smolder and reignite for long periods of time.

If sediment has accumulated at the inlet of the rain garden, remove it with a shovel and dispose of it in a trash can. This sediment cannot be composted because it has heavy metals in it.

During one volunteer workday, a 400 square foot rain garden can likely be weeded, mulched and leaves/sediment can be removed with two or three classes of students.

Summer- If the rain garden is planted in the spring, it must be watered throughout the first summer (see previous page for watering instructions). During the second summer, the rain garden may need to be watered if there is no rain for more than one week. If the rain garden is planted in the fall, it must be watered during July and August of the following summer if there are periods of prolonged drought.

Throughout the summer, it is important to weed- see the previous page for species labeled in yellow. One visit every two weeks by a volunteer is sufficient.

Fall- If the rain garden is planted in the fall, it is important to check on the plugs after the first freeze/thaw to see if any plugs have popped out of the ground. If they have, plugs can be pushed back into the ground.

Cut back standing dead plants before winter and leave dead stalks on the ground to decompose. This is purely aesthetic. If you want to leave the standing dead plants as they are, that is no problem and can actually provide some habitat structure for wildlife.

The rain garden should be edged to create a clean perimeter and discourage turf grass from entering the garden. The easiest way to maintain a clean edge is to dig straight down along the perimeter of the garden with a flat shovel. Make sure that the bottom of your rain garden remains flat. See photos to the right.

Early fall is the best time to remove some invasives, see the previous pages for the species labeled in blue. Make sure to remove these invasives before their flowers go to seed.

During one volunteer workday, a 400 square foot rain garden can likely be weeded, mulched, edged and the standing dead could be cut down with two or three classes of students.
APPENDIX: SUPPORTING MATERIALS

5th graders preparing plants with a Master Gardener volunteer | Spring 2017
Photo credit: Linda Prieskorn
BIRD HILLS

STORMDRAIN

round one
PLANT

HURON RIVER
You fall as rain into a stream
GO TO THE HURON RIVER

You fall as rain onto a hill
GO TO BIRD HILLS

You fall as rain and roll into the stormdrain
GO TO THE DRAIN
You move slowly underground and flow into a stream
GO TO THE HURON RIVER

A plant takes you in through its roots
GO TO PLANT

You move slowly underground and flow into a stream
GO TO THE HURON RIVER

A plant takes you in through its roots
GO TO PLANT

A plant takes you in through its roots
GO TO PLANT

1. groundwater
You roll downhill and enter a stream
GO TO THE HURON RIVER

You roll downhill and enter a stream
GO TO THE HURON RIVER

You fall as rain and roll into the stormdrain
GO TO THE DRAIN

A plant takes you in through its roots
GO TO PLANT

You fall as rain and roll into the stormdrain
GO TO THE DRAIN

You soak into the ground
GO TO GROUNDWATER
You move quickly through a drain and fall into the stream
GO TO THE HURON RIVER
You evaporate into the air
GO TO THE CLOUD

The plant uses you to grow
ROLL AGAIN

You fall down an old root tunnel
GO TO GROUNDWATER

You are in the plant's fruit & a bird eats you
GO TO ANIMAL

The plant breathes you into the air as vapor
GO TO CLOUD

You are in the plant's fruit & a bird eats you
GO TO ANIMAL
An animal comes to the stream and drinks you up
GO TO ANIMAL

A plant uses you to grow
GO TO PLANT

You evaporate into the air
GO TO CLOUD

You seep into the ground
GO TO GROUNDWATER

You evaporate into the air
GO TO CLOUD

You flow downstream
ROLL AGAIN & STAY IN HURON RIVER
After drinking you, a bird pees and you end up in a stream
GO TO THE HURON RIVER

After drinking you, a bird pees and you land on a hill
GO TO BIRD HILLS

You are exhaled from the bird's lungs into the air as vapor
GO TO THE CLOUD

After drinking you, a bird pees and you end up rolling into the stormdrain
GO TO THE DRAIN

You are exhaled from the bird's lungs into the air as vapor
GO TO THE CLOUD

The bird uses you to grow bigger
ROLL AGAIN & STAY IN ANIMAL
You overflow into a rain garden
GO TO RAIN GARDEN

An animal comes to the stream and licks you up
GO TO ANIMAL

You evaporate into the air
GO TO CLOUD

You seep into the ground and enter the groundwater
GO TO GROUNDWATER

You evaporate into the air
GO TO CLOUD

You flow downstream
ROLL AGAIN & STAY IN THE HURON RIVER
After drinking you, a bird pees and you end up in a stream
GO TO THE HURON RIVER

After drinking you up, a bird pees and you end up on the ground
GO TO BIRD HILLS

You are exhaled from the bird’s lungs into the air as vapor
GO TO THE CLOUD

A bird pees and you end up rolling into the rain garden
GO TO THE RAIN GARDEN

You are exhaled from the bird’s lungs into the air as vapor
GO TO THE CLOUD

The bird uses you to grow bigger
ROLL AGAIN & STAY IN THE ANIMAL
You fall as rain into a stream
GO TO THE HURON RIVER

You fall as rain onto a hill
GO TO BIRD HILLS

You fall as snow onto the street and into the rain garden
GO TO THE RAIN GARDEN

You fall onto the street & into the rain garden
GO TO THE RAIN GARDEN
<table>
<thead>
<tr>
<th>GO TO PLANT</th>
<th>GO TO PLANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>You move slowly underground and flow into a stream</td>
<td>You move slowly underground and flow into a stream</td>
</tr>
<tr>
<td><strong>GO TO THE HURON RIVER</strong></td>
<td><strong>GO TO THE HURON RIVER</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A plant takes you in through its roots</th>
<th>A plant takes you in through its roots</th>
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<tbody>
<tr>
<td><strong>GO TO PLANT</strong></td>
<td><strong>GO TO PLANT</strong></td>
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<tr>
<th>2. groundwater</th>
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<td>2. groundwater</td>
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<table>
<thead>
<tr>
<th>You move slowly underground and flow into a stream</th>
<th><strong>GO TO THE HURON RIVER</strong></th>
</tr>
</thead>
</table>
You soak into the ground and get absorbed by roots
GO TO PLANT

You evaporate into the air
GO TO THE CLOUD

You freeze in ice and are trapped until you thaw
STAY ON HILL AND ROLL AGAIN

You fall downhill into a parking lot and into the rain garden
GO TO THE RAIN GARDEN

You fall downhill into a parking lot and into the rain garden
GO TO THE RAIN GARDEN

You soak into the ground
GO TO GROUNDWATER
You soak into the ground
GO TO GROUNDWATER

A bird comes by and drinks you up
GO TO ANIMAL

You soak into the ground and get absorbed by roots
GO TO PLANT

You soak into the ground
GO TO GROUNDWATER

You soak into the ground
GO TO GROUNDWATER

You soak into the ground
GO TO GROUNDWATER

2. rain garden

2. rain garden

2. rain garden

2. rain garden

2. rain garden

2. rain garden
You evaporate into the air
GO TO THE CLOUD

The plant uses you to grow
STAY AT PLANT AND ROLL AGAIN

You fall through the soil alongside the roots
GO TO GROUNDWATER

The plant breaths you into the air as vapor
GO TO CLOUD

The plant stores you in its fruit, and a bird eats you
GO TO ANIMAL

The plant stores you in its fruit, and a bird eats you
GO TO ANIMAL
Additional Resource Guides

1. Washtenaw County Rain Garden website
   www.washtenaw.org/raingardens

2. Washtenaw County sample gardens for different light and soil requirements

3. “The Blue Thumb guide to Rain Gardens: Design and Installation for Homeowners in the Upper Midwest”. Rusty Schmidt, Dan Shaw, and David Dods. Available by emailing: raingardens@yahoo.com, via Amazon or from the Minnesota Sea Grant

4. Rain garden iPhone App, by UCONN, CT Sea Grant, Connecticut Cooperative Extension & CLEAR program. You must choose a state and Michigan isn’t listed as an option so choose Connecticut


7. “Lakescaping for Wildlife” Minnesota Department of Natural Resources. Available via Amazon, or directly from the Minnesota State Bookstore

   tinyurl.com/MRGforum