

Orcas Love Raingardens

Activity Packet

At Home Education in the Raingarden

Raingardens not only help protect salmon and orcas, but they can also serve as fun outdoor learning labs. Below are a few easy ways your family can use a raingarden to learn outside of the “classroom.” **To find a raingarden near you, visit: [\[soundimpacts.org\]](https://soundimpacts.org)**

Recommended grade levels are included, however activities are intended for students of all ages. Additionally, although many of the activities included in this packet are intended to be done at a raingarden, you can do almost all of them at home with pictures of raingardens and the resources provided.

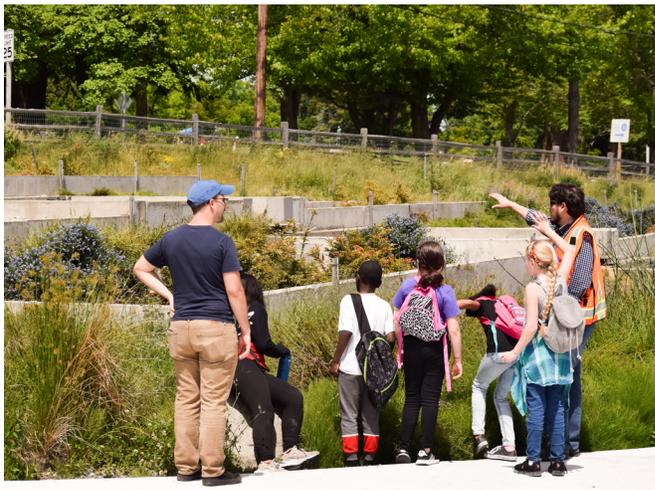


photo by Andrew A. Redding



Recommended for K-3rd grade

1. **Reading and journaling:** Visit a raingarden to read quietly or write in your journal.
2. **Color in the raingarden:** Color our worksheets to learn how raingardens help orcas.
3. **Stormwater Bingo:** Take a walk through your neighborhood to complete your Stormwater Bingo
4. **Which animals are visiting the raingarden?** Which plants? When?: Keep an eye out for pollinators, birds, and other animals that visit the raingarden. Draw what you see.
5. **Plant sketching:** Hone their naturalist skills by sketching raingarden plants.
6. **Seasonal changes:** Draw the raingarden in each season and record how it changes.

Recommended for 4th-8th grade

1. **Drawing the raingarden:** Draw the raingarden. Try to identify where water comes in and out.
2. **How do raingardens help orcas?:** Fill in the blank to learn how raingardens help orcas.
3. **Plant phenology:** Visit the plants throughout the year to document their different life cycle stages.
4. **Planting zones:** Are different plants located in different areas of the raingarden? Draw the plants that are found together and see if you can figure out why they're planted where they are.
5. **How much runoff is treated during a rainstorm?:** Use a cup to collect rainfall and multiply the inches collected by the size of the raingarden to calculate the volume of runoff treated.
6. **Infiltration rates of mulched area vs. bare soil vs. grass (Soils as Sponges):** Examine how quickly water goes in the ground on different surfaces. Pour water onto the different surfaces and time how long it takes to absorb. The quicker the better!
7. **Make a map of the green infrastructure in your neighborhood:** Draw a map of your neighborhood, take a walk, and look for green infrastructure such as raingardens, rain barrels, permeable pavement, and bioswales. Label them on the map.



Helpful Definitions for All Activities

Green infrastructure: Nature-based solutions to treat stormwater runoff. Green infrastructure slows the runoff to clean and filter out pollutants before it reaches the storm drain and flows to our creeks, lakes, and Puget Sound. Green infrastructure includes raingardens, planted ditches (called swales or bioswales), permeable pavement, green roofs, and more.



Impervious surface: A hard surface that prevents or slows water from being naturally absorbed into the ground. When houses, streets, shopping centers, and businesses are built, natural soil and plants are replaced by hard surfaces, such as roofs and pavement. When rain falls on these hard surfaces, it cannot soak into the ground, so it quickly becomes runoff.

Pollutants/pollution: Substances, chemicals, or other things that are somewhere that they are not supposed to be. Pollutants can be things you see, like trash, and things you can't see, like dissolved metals. Many pollutants are harmful to the environment and the animals and people that live there.



Raingarden: A raingarden is a shallow bowl-shaped garden that uses soils and plants to soak up, filter and clean rainwater runoff from a nearby downspout, driveway or sump pump. Raingardens help protect our creeks by capturing rainwater before it enters a storm drain, slowing it down and allowing it to absorb into your soil.



Rainwater: Clean water that has fallen as rain.

Stormwater runoff: Stormwater runoff is the rainwater that falls on our streets and roofs and flows into storm drains. Stormwater runoff picks up what it touches, like oil from the road, yard chemicals and pet waste. This polluted water then runs off into our creeks, lakes, and Puget Sound. Stormwater runoff is not filtered or treated to remove the pollutants and can be highly toxic to our fish and wildlife.





Videos to learn more about **raingardens** & **stormwater runoff**

Click the [links] below!

Polluted Puddles - Arlo's quest to clean up our mess:
[<https://www.youtube.com/watch?v=ysu1qYSAsBU>]

How to plant a raingarden to help orcas:
[https://www.youtube.com/watch?time_continue=11&v=-eK-7t8OUJKM&feature=emb_logo]

Solving Stormwater:
[<https://www.washingtonnature.org/cities/solvingstormwater>]

Lost and Puget Sound:
[<https://vimeo.com/23283018>] [WK1]



Activity 1: Reading and journaling

Short Description: Visit a raingarden to read quietly or write in your journal

Materials:

Pencil or pen

Journal or blank pieces of paper

Clipboard or something to write on (optional)

Directions:

Raingardens can provide a quiet place to enjoy nature and read or write in your journal. Use the map to find a raingarden near you and bring a book or your journal. You can journal about the raingarden or about any topic you want!

When visiting the raingarden:

- **Look around - What do you see? What colors do you see?**
- **Close your eyes and think about what you hear?**
- **What does the ground feel like below your feet?**
- **What do you feel when you're at the raingarden?**
- **Can you smell anything?**



Activity 2: Color in the Raingarden

Short Description: Color our worksheets to learn how raingardens help orcas.

Materials:

Printed coloring sheets

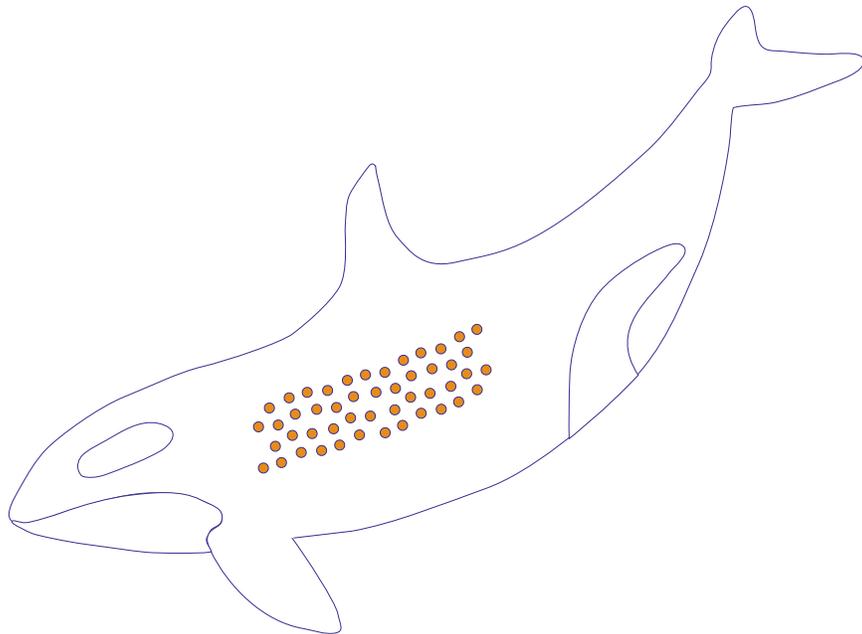
Coloring utensils - pencils, markers, or crayons

Directions:

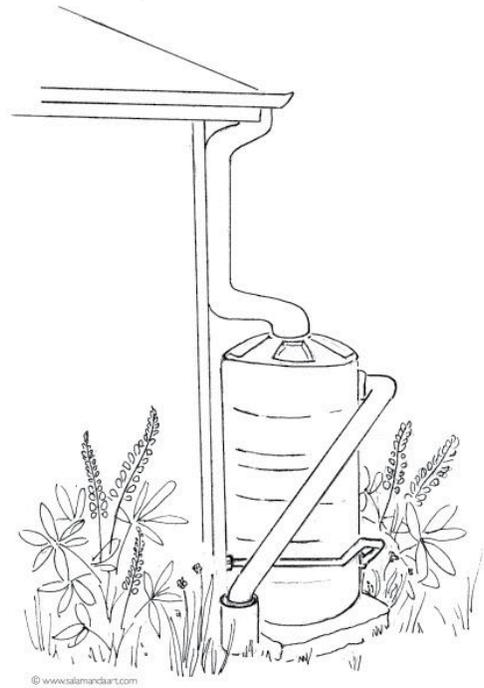
Print off the coloring sheet below and color them in to learn how raingardens help orcas!



Coloring Sheets



Coloring Sheets



Activity 3: Stormwater Bingo

Short Description: Take a walk through your neighborhood to complete your Stormwater Bingo Card

Materials:

[Bingo card]

Pencil or pen

Clipboard or something to write on

Directions:

Take a walk through your neighborhood and look for the items you see on your Bingo card.

When you find the items along your walk, cross it off, and match it with the square on the back of your card to learn more about keeping our waters clean and healthy!



Activity 4: Animals in the Raingarden

Short Description: Which animals are visiting the raingarden? Which plants? When?

Materials:

Pencil or pen

Journal or blank sheets of paper

Colored pencils, crayons, or markers (optional)

Clipboard or other hard surface to write on the go (optional)

Directions:

Raingardens can provide natural habitat for many animals. Look closely at the raingarden for visiting animals. Keep an eye out for pollinators, such as bees, birds, and insects that visit the raingarden. If you don't see any animals immediately, look at the soil and closely at the plants. Do you see any ants, spiders, or other insects?

Using a field guide, an app such as iNaturalist, or internet search engines, try to identify which creatures are visiting your garden.

- Draw or make a list of draw the animals you see. Do you see any bugs? Birds? Animals with four legs? Do you see any pollinators?
- Do you notice if certain animals visit specific plants? If animals are visiting specific plants, draw the animals on the plants.

Resources:

iNaturalist - [www.inaturalist.org] iNaturalist is an app and website that helps you figure out what plants and animals live in your neighborhood. You can make observations and upload them using the app, then they pop up on the map. Even if you don't know what a plant or bug it is, you can take a picture and the app will give you suggestions. It's a great way to explore nature right outside your door!

Insect guide: [<https://www.insectidentification.org/>]

Bird Guides: [<http://www.nwnature.net/birds/>]
[<http://www.rainieraudubon.org/commonbirds1.htm>]

Helpful definitions:

Pollinator: Anything that helps move pollen from one plant to another. Pollen must be moved and exchanged to help plants produce fruit, seeds, and young plants. Many plants are pollinated by insects and animals such as bees, butterflies, and birds.



Activity 5: Plant sketching

Short Description: Hone your naturalists skills by sketching raingarden plants.

Background:

Scientists use sketches to record and communicate information, not to make art. Drawing like a scientist is different than drawing what you have in your mind. To draw like a scientist, you need to observe closely and try drawing exactly what you see.

The **ABCDE** trick can help! Scientific drawing should be:

Accurate
Big
Colorful
Detailed
Explained

(use labels, explanations, and questions)

See the resources below for more tips and tricks for drawing like a scientist!

Materials:

- **Pencil or pen**
- **Worksheet or blank sheet of paper**
- **Colored pencils, crayons, or markers (optional)**
- **Clipboard or other hard surface to write on the go (optional)**
- **or internet search engines, try to identify which creatures are visiting your garden.**

Directions:

For this activity, we want to practice drawing like a scientist. Use the worksheet provided or copy the table from the worksheet on a blank sheet of paper.

1. There are lots of plants in the raingarden. Start by choosing one to draw.
2. Observe the plant closely. What shape are its leaves? Are the leaves individual or close together? Does it have flowers, buds, or other unique features?
3. Draw the plant you are observing being careful to capture its unique features like a scientist would. Scientists want to make sure their drawings look just like the real thing.
4. After you complete your first drawing, compare it to the plant. How could your drawing improve to look more like the plant? Write down how your drawing could look more like the real plant.
5. Draw the plant again using what you learned from your first drawing to make it look more like the plant.
6. Draw two more plants using this same method – draw it first, compare it to the plant to see how it can be improved, and draw it again.

Resources:

To learn more about scientific sketching, visit:

[\[https://www.calacademy.org/educators/lesson-plans/introduction-to-scientific-sketching\]](https://www.calacademy.org/educators/lesson-plans/introduction-to-scientific-sketching)

Watch this video to learn how to draw like a scientist!

[\[https://www.youtube.com/watch?v=E_6PskE3zfQ\]](https://www.youtube.com/watch?v=E_6PskE3zfQ)



Activity 5: Plant sketching

	Drawing 1	How can can Drawing 1 be improved to look more like the plant?	Drawing 2
Plant 1			
Plant 2			
Plant 3			



Activity 6: Seasonal Changes

Short Description: Draw the raingarden in each season and record how it changes. For a closer look at seasonal changes, see **Activity 9: Plant Phenology**.

Materials:

- **Pencil or pen**
- **Worksheet or blank sheet of paper**
- **Colored pencils, crayons, or markers (optional)**
- **Clipboard or other hard surface to write on the go (optional)**

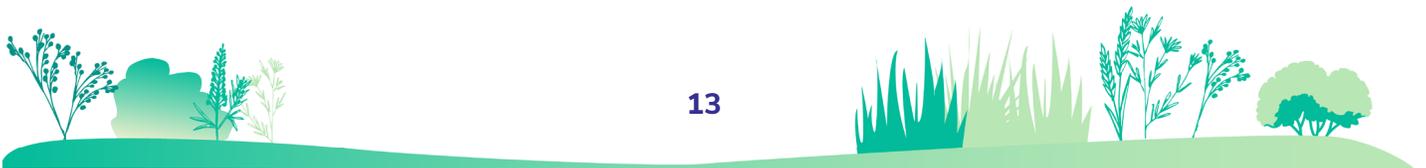
Directions:

Raingardens, just like the rest of nature, follow seasonal patterns. Visit the raingarden in each season and draw what you see. Either use the worksheet or a blank sheet of paper.

1. Observe the whole raingarden. Do you see water pooling in the raingarden?
2. Observe the plants. What color are the plants? Are there leaves or flowers on the plants?
3. Draw what you see. Record the season, date, and some of your observations on the worksheet or other sheet of paper.
4. Visit the raingarden in the next season to observe how it changed. Your garden can now be used as a model to show seasonal change!

Resources:

Seasonal patterns: Characteristics of the natural world that are linked to the seasons. For example, Fall is characterized by the changing of the color of leaves.



Activity 6: Seasonal Changes

Season: _____

Date: _____

Observations: _____



Activity 7: Drawing the Raingarden

Short Description: Draw the raingarden. Identify how water moves in and out of the raingarden

Materials:

- Pencil or pen
- Worksheet or blank sheet of paper
- Colored pencils, crayons, or markers (optional)
- Clipboard or other hard surface to write on the go (optional)

Directions:

Using the worksheet or a blank piece of paper, create a diagram of the raingarden. Your diagram can be of the raingarden viewed from the top (bird's eye view) or can be of the raingarden viewed from the side ("cross section").

You can use the resources below to help guide your drawing but try to make your drawing specific to the raingarden you're viewing!

All raingardens are a little different but they all have similar features. They are shaped like a bowl, covered in **mulch**, have special **raingarden soil**, plants, and are designed to capture and filter **stormwater runoff**.

1. For your diagram, start with its shape - what shape is the raingarden? If you're drawing the raingarden from the side, how deep is the raingarden?
2. Do you see any plants? Draw the plants that you see.
3. Raingardens are meant to capture rainwater runoff. Do you see where water can come into the raingarden? Sometimes there is a pipe, or a cut in the sidewalk, or rocks directing water to the raingarden.
4. Draw an arrow where water is coming into the raingarden. This is called the **inflow**.
5. Raingardens have special soil that help absorb stormwater runoff. Draw an arrow for where water is being absorbed by the raingarden.
6. Draw an area where excess water is leaving the raingarden. This is called **outflow**.

Resources:

Raingarden Diagrams



Activity 7: Drawing the Raingarden

Features of the raingarden to include:

raingarden soil

plants

mulch

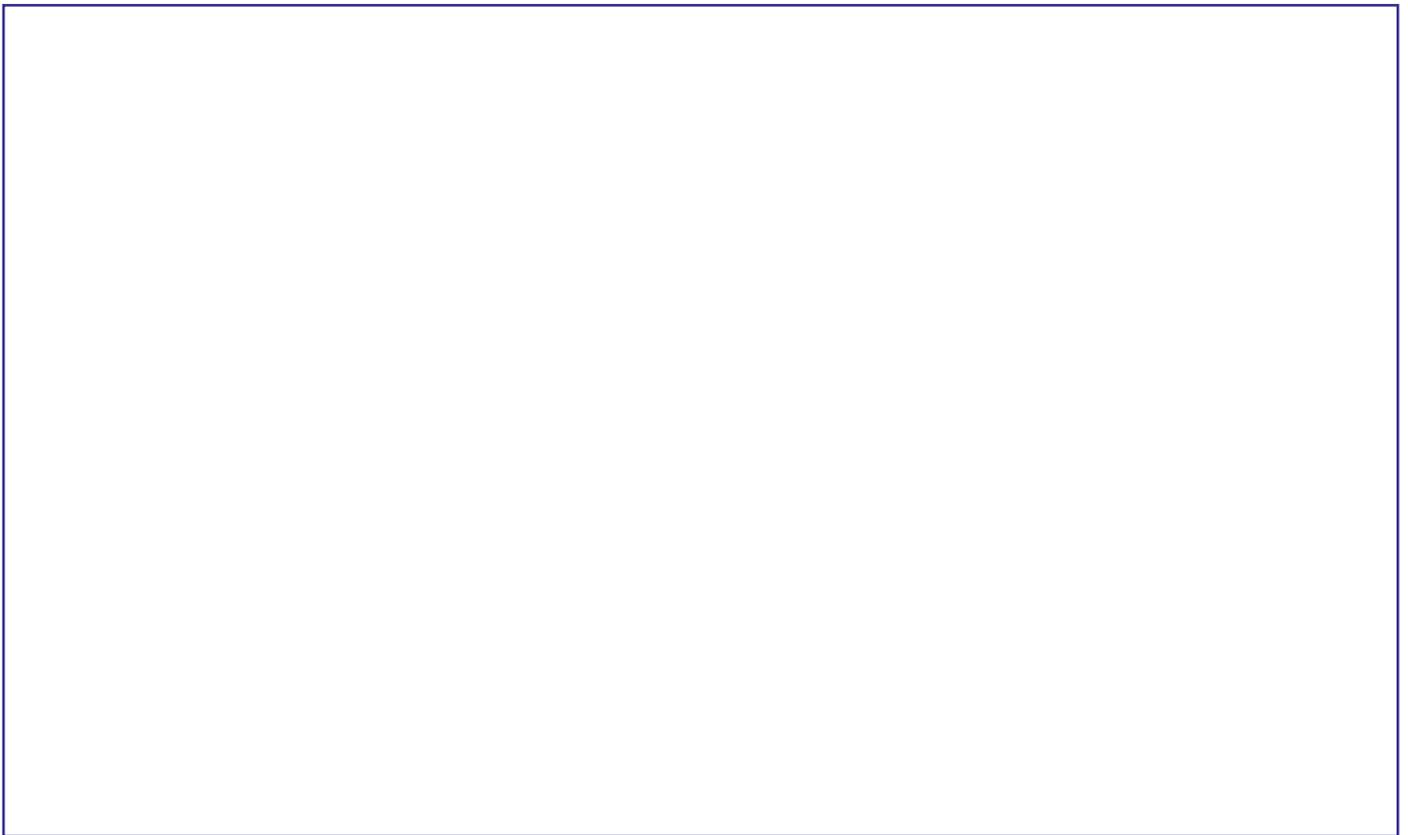
Draw arrows showing:

inflow

outflow

absorption

My Raingarden:



Definitions:

Raingarden soil: special soil to help raingardens clean polluted runoff

Mulch: wood chips or other material to over and protect the soil

Inflow: water moving INTO the raingarden

Outflow: water moving OUT of the raingarden

Absorption: water being soaked up by the ground.



Helpful Definitions

Absorb: Absorb is the ability of the ground to soak up water.

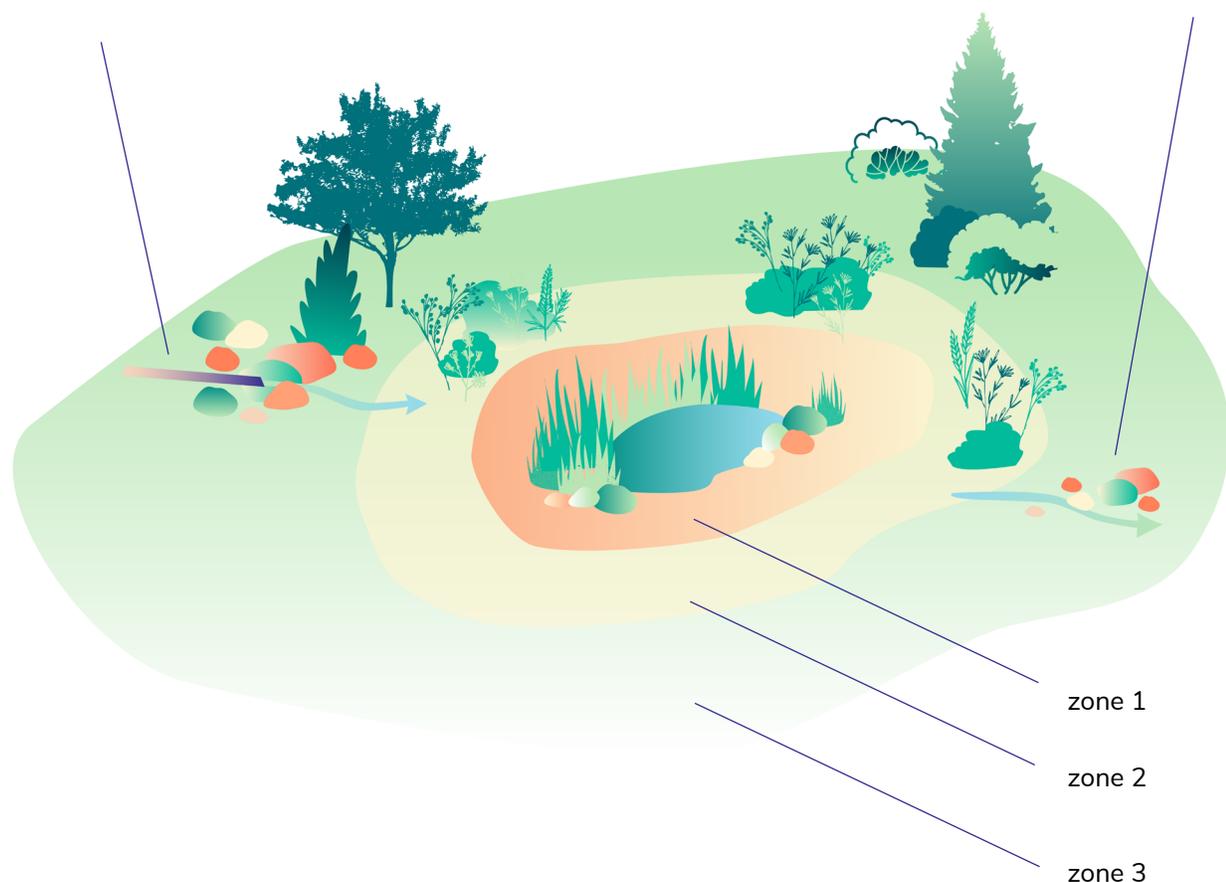
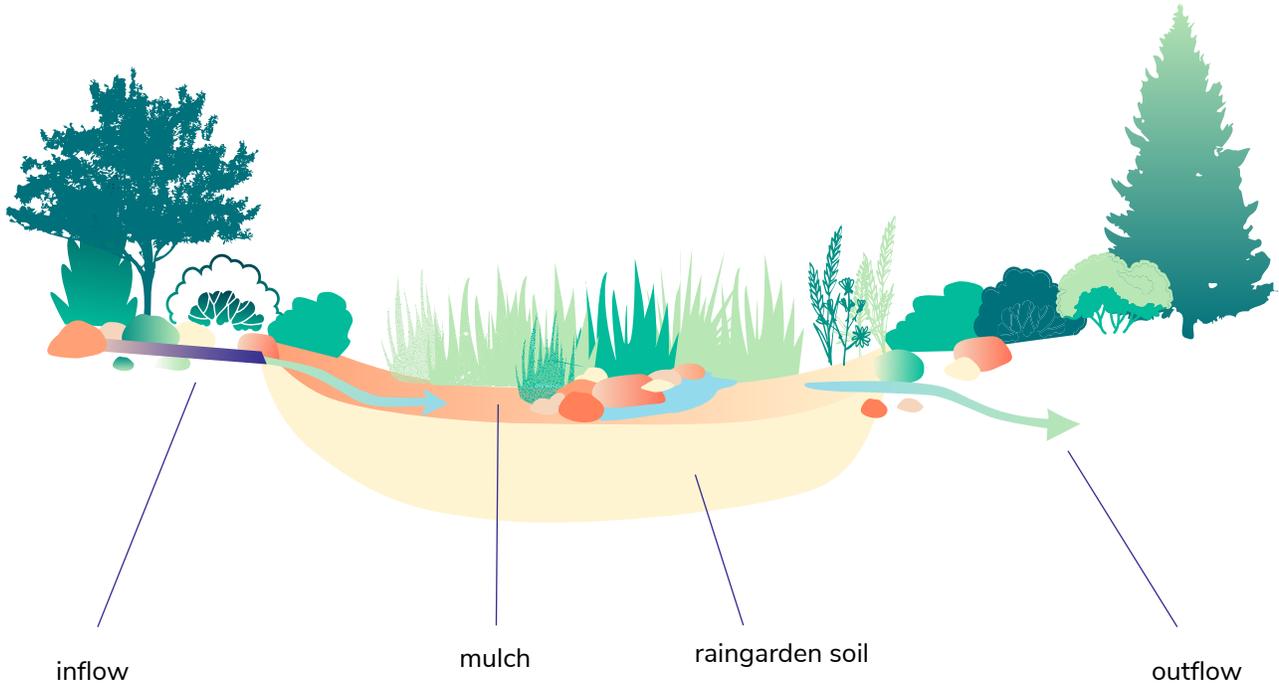
Mulch: Wood chips or other material used to cover and protect the ground. Mulch also helps prevent weeds from growing.

Raingarden soil: Special soil designed to absorb and clean polluted water.

Stormwater runoff: Stormwater runoff is the rainwater that falls on our streets and roofs and flows into storm drains. Stormwater runoff picks up what it touches, like oil from the road, yard chemicals and pet waste. This polluted water then runs off into our creeks, lakes, and Puget Sound. Stormwater runoff is not filtered or treated to remove the pollutants and can be highly toxic to our fish and wildlife.



Raingarden Diagrams



Activity 8: How do raingardens help orcas?

Short Description: Fill in the blank to learn how raingardens help orcas.

Background:

The #1 source of **pollution** to the Salish Sea comes from polluted **stormwater** running off our streets, parking lots, and highways directly into our waterways.

Green infrastructure, such as raingardens, are a great way to keep pollution out of the Salish Sea by mimicking natural processes and integrating nature with development. **Raingardens** are bowl-shaped gardens that collect and absorb dirty stormwater runoff. Raingarden soil can naturally filter out pollutants and prevent them from reaching our rivers and the Salish Sea.

When pollution is not filtered through a raingarden, it flows into our waterways and enters the **food chain**. When a predator eats its prey, it also eats the pollution. With each link in the food chain, the pollution builds up and concentrates. At the top of the food chain are Southern Resident orcas which are the most polluted whales in the world.

Materials:

- **Computer or phone to watch the videos**
- **Pencil or pen**
- **Worksheet**
- **Colored pencils, crayons, or markers (optional)**

Directions:

Watch the videos below to learn more about raingardens and orcas.

After watching the videos, fill out the worksheet to show how raingardens help orcas.

Resources:

Video, Polluted Puddles - Arlo's quest to clean up our mess:

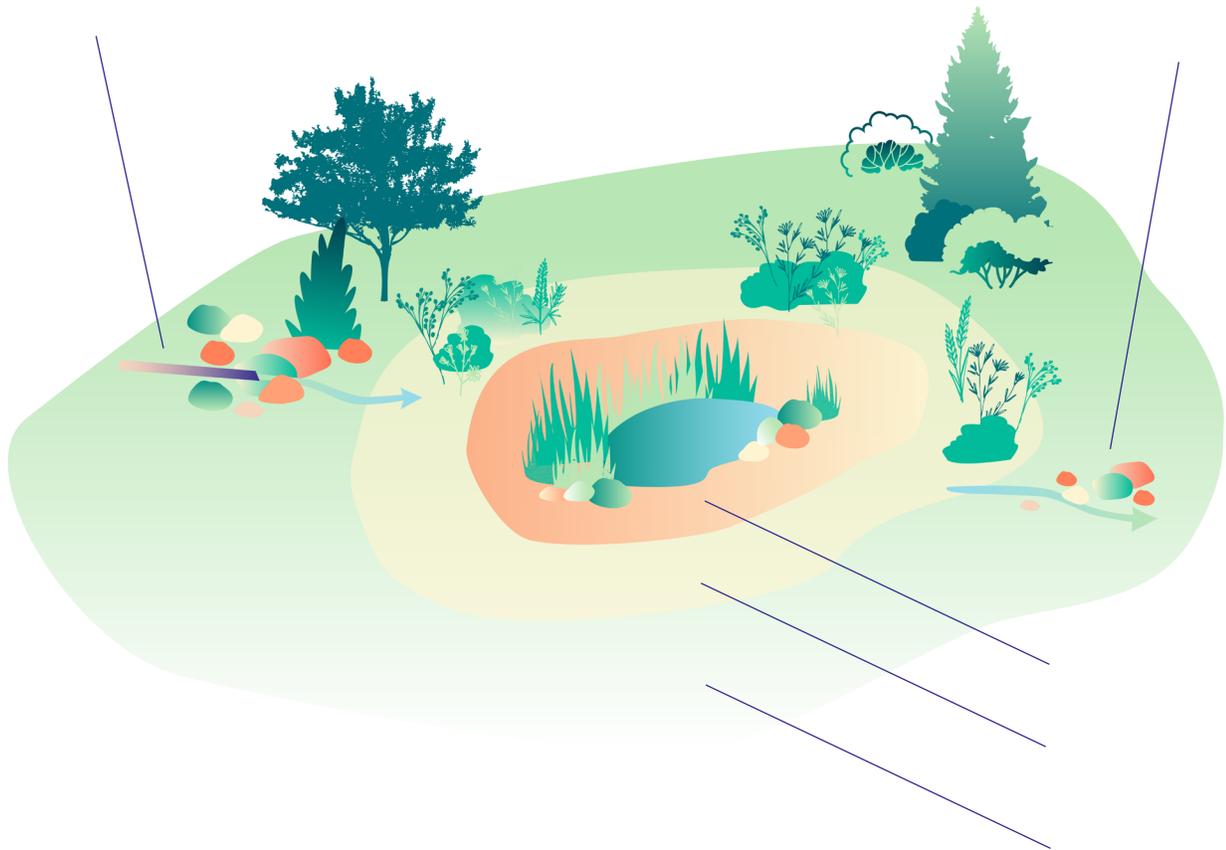
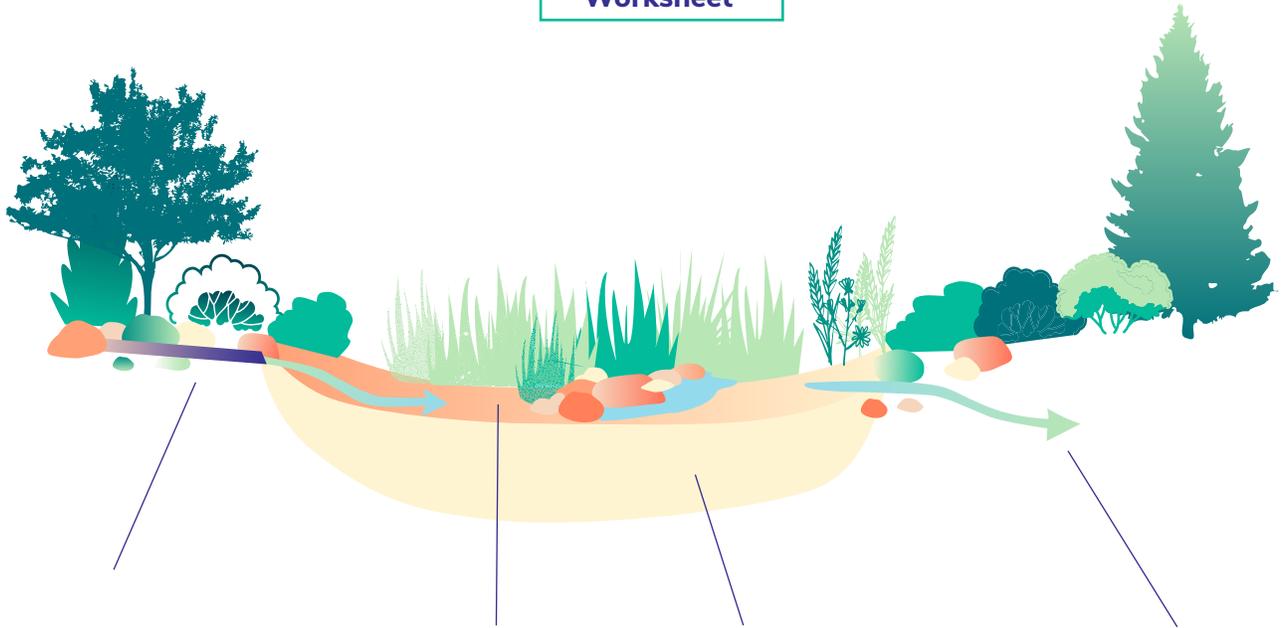
[<https://www.youtube.com/watch?v=y-su1qYSAsBU>]

Video, How to plant a raingarden to help orcas: [https://www.youtube.com/watch?time_continue=11&v=-eK7t8OUJKM&feature=emb_logo]



Activity 8: How do raingardens help orcas?

Worksheet



Helpful Definitions

Food chain: A food chain is the order in which organisms depend on each other for food.

Green infrastructure: Nature-based solutions to treat stormwater runoff. Green infrastructure slows the runoff to clean and filter out pollutants before it reaches the storm drain and flows to our creeks, lakes, and Puget Sound. Green infrastructure includes raingardens, planted ditches (called swales or bioswales), permeable pavement, green roofs, and more.

Impervious surface: A hard surface that prevents or slows water from being naturally absorbed into the ground. When houses, streets, shopping centers, and businesses are built, natural soil and plants are replaced by hard surfaces, such as roofs and pavement. When rain falls on these hard surfaces, it cannot soak into the ground, so it quickly becomes runoff.

Pollutants/pollution: Substances, chemicals, or other things that are somewhere that they are not supposed to be. Pollutants can be things you see, like trash, and things you can't see, like dissolved metals. Many pollutants are harmful to the environment and the animals and people that live there.

Raingarden: A raingarden is a shallow bowl-shaped garden that uses soils and plants to soak up, filter and clean rainwater runoff from a nearby downspout, driveway or sump pump. Raingardens help protect our creeks by capturing rainwater before it enters a storm drain, slowing it down and allowing it to absorb into your soil.

Stormwater runoff: Stormwater runoff is the rainwater that falls on our streets and roofs and flows into storm drains. Stormwater runoff picks up what it touches, like oil from the road, yard chemicals and pet waste. This polluted water then runs off into our creeks, lakes, and Puget Sound. Stormwater runoff is not filtered or treated to remove the pollutants and can be highly toxic to our fish and wildlife.



Activity 9: Plant phenology

Short Description: Visit the plants throughout the year to document their **phenology**. For a broader look at seasonal changes, see **Activity 6: Seasonal Changes**.

Materials:

Pencil or pen

Worksheet or blank piece of paper

Colored pencils, crayons, or markers (optional)

Clipboard or other hard surface to write on the go (optional)

Directions:

Select a plant to observe.

- Using the **plant part overview** resource below, identify each part of your plant. Including its roots, stem, leaves, flowers, and fruit. Does your plant have all of these parts?
- Use the plant report worksheets available on the **Budburst** website to document your plant at a point in time, or visit multiple times to record its changes over a whole year. You can use your own notebook if you want, just make sure to record the date and the stage the plant is in (have the leaves budded, are the flowers blooming, have the fruits/cones appeared, etc.).
- If you have access to a plant regularly, keep an eye on it so you're ready to record its stage every time there's something new. Then, you'll have a report card for your plant for the year, and can use that to compare future years.

Resources:

Plant part overview:

[<https://web.extension.illinois.edu/gpe/case1/c1facts2a.html>]

More activities at

[www.budburst.org/forfamilies]

PCD budburst activity:

[<https://piercecd.org/Blog.aspx?IID=247#item>]

Learn more about phenology with IslandWood's Phenology Fridays:

[<https://islandwood.org/get-involved-with-environmental-steam-education/phenology-friday/>]

Helpful definitions:

Phenology: Phenology is the study of the cycles and seasons of natural phenomena, like budding plants, fruiting trees, and migrating animals.



Activity 10: Planting zones

Short Description: Are different plants located in different areas of the raingarden? Draw the plants that are found together and see if you can figure out why they're planted where they are.

Materials:

Pencil or pen

Worksheet or blank piece of paper

Colored pencils, crayons, or markers (optional)

Clipboard or other hard surface to write on (optional)

Directions:

1. Collect your materials and bring them to the raingarden.
2. Take a close look at the raingarden. Do you notice different plants in the middle of the raingarden compared to the edge?
3. Draw the raingarden as if you were viewing it from the sky. Draw the plants where they are located in the raingarden. Can you group similar plants together? Are the plants located in the middle of the raingarden similar? Are the plants located around the edge of the raingarden similar?
4. Draw the plants found in each zone of the raingarden. There may or may not be three zones.
5. Raingardens are designed to capture and absorb water when it rains. Sometimes when it rains too much, the raingarden can't absorb the water fast enough and the water will pool in the middle.
6. For the plants located near the center of the raingarden, do you think they like more or less water? What about the plants located near the edge?
7. Use the resources below to learn more about raingarden planting zones.

Resources:

Western WA Manual - [Section 3 (page 45) on planting zones and Appendix 2]

Raingarden diagram (bird's eye view)



Activity 10: Planting zones

Draw the raingarden. Group together and label any planting zones you see.



Draw the plants found in zone 1



Draw the plants found in zone 2



Draw the plants found in zone 3



How many planting zones do you see? _____

Why are there different planting zones in a raingarden? _____



Activity 11: Stormwater Runoff

How much runoff is treated during a rainstorm?

Short Description: Calculate how much runoff is treated by a raingarden, or created by an impervious surface.

Background:

Stormwater runoff is the #1 source of **pollution** to the Salish Sea and is known to impact our region's salmon and orcas. **Stormwater runoff** is the **rainwater** produced by **impervious surfaces** such as roads, parking lots, and driveways. Instead of absorbing the rainwater like natural soils do, impervious surfaces mobilize rainwater and create stormwater runoff. Stormwater runoff can carry any of the pollution found on the impervious surface, including oil, animal waste, chemicals, and trash, into the nearest waterway.

Green infrastructure, such as raingardens, are a great way to keep pollution out of the Salish Sea by mimicking natural processes and integrating nature with development. **Raingardens** are bowl-shaped gardens that collect and absorb dirty stormwater runoff. Raingarden soil can naturally filter out pollutants and prevent them from reaching our rivers and the Salish Sea.

In this activity, we are going to calculate how many gallons of stormwater are either treated by a raingarden, or generated by an impervious surface. You can measure your own rainfall on a rainy day, or use a weather report to find the amount of rainfall.

Materials:

- **Rain gauge (optional, see information below on how to make your own)**
- **Ruler or measuring tape**
- **Paper and pencil to record and calculate**

Directions:

1. Select either a raingarden or impervious surface to measure. Your impervious surface could be a driveway, basketball court, parking lot, etc.
2. Using a rain gauge, or the weather report after a rainy day, find out how many inches of rain fell. You can also use the average of 40" that Pierce County receives in a given year.
3. Convert the daily amount of rainfall to feet
$$\text{Feet} = \text{inches} \times 0.083333$$

Example: 2" of daily rainfall equals 0.167 feet
4. Measure the raingarden or impervious surface in feet and calculate the area. The formula to calculate area will depend on the shape of your raingarden or impervious surface.
5. Multiply the area of the raingarden/impervious surface by the daily rainfall amount to get the volume of rainfall



Volume of rainfall (in cubic feet) =
area (in sq feet) x amount of rainfall (in feet)

Example: For a 500 square foot driveway, multiple 500 sq ft times 0.167 feet of rain to equal 83.33 cubic feet.

6. To convert it the volume of rainfall into gallons

1 cubic foot = 7.481 gallons

Example: 83.33 cubic feet times 7.481 equals 623.39 gallons

7. How much runoff was either produced, or treated, by the raingarden or impervious surface?
8. In the example, a 500 square foot driveway that receives 0.167 feet of rain produces 623 gallons of runoff. That same driveway produces 12,468 gallons of runoff over a year!
9. Assuming your daily rainfall happens every day, how much did the raingarden treat (or impervious surface generate) in a year? You can also look up annual rainfall for a more accurate number.

Resources:

How to make your own rain gauge:

[<https://www.wikihow.com/Build-a-Rain-Gauge>]

Helpful definitions:

Green infrastructure: Nature-based solutions to treat stormwater runoff. Green infrastructure slows the runoff to clean and filter out pollutants before it reaches the storm drain and flows to our creeks, lakes, and Puget Sound. Green infrastructure includes raingardens, planted ditches (called swales or bioswales), permeable pavement, green roofs, and more.

Impervious surface: A hard surface that prevents or slows water from being naturally absorbed into the ground. When houses, streets, shopping centers, and businesses are built, natural soil and plants are replaced by hard surfaces, such as roofs and pavement. When rain falls on these hard surfaces, it cannot soak into the ground, so it quickly becomes runoff.

Pollutants/pollution: Substances, chemicals, or other things that are somewhere that they are not supposed to be. Pollutants can be things you see, like trash, and things you can't see, like dissolved metals. Many pollutants are harmful to the environment and the animals and people that live there.

Rain gauge: A rain gauge is a tool used to measure the amount of rainfall.

Rain water: Clean water that has fallen as rain.

Raingarden: A raingarden is a shallow bowl-shaped garden that uses soils and plants to soak up, filter and clean rainwater runoff from a nearby downspout, driveway or sump pump. Raingardens help protect our creeks by capturing rainwater before it enters a storm drain, slowing it down and allowing it to absorb into your soil.

Stormwater runoff: Stormwater runoff is the rainwater that falls on our streets and roofs and flows into storm drains. Stormwater runoff picks up what it touches, like oil from the road, yard chemicals and pet waste. This polluted water then runs off into our creeks, lakes, and Puget Sound. Stormwater runoff is not filtered or treated to remove the pollutants and can be highly toxic to our fish and wildlife.



Activity 12: Soil as Sponges

Short Description: Examine how quickly water goes in the ground on different surfaces. Pour water onto the different surfaces and time how long it takes to absorb. The quicker the better!

Materials:

Can

Stopwatch

Measuring cup

Pencil or pen to record

Worksheet or blank sheet of paper

Directions:

1. Collect materials.
2. Select three different surfaces to test the **infiltration** rates such as soil, grass, bark, or in the raingarden.
3. Cut an aluminum can or similar container so it is open on both sides. Be sure to tape any sharp edges for safety.
4. Place the can onto the ground in the grass or on soil. Twist it into the ground so there is no space for water to leak out the bottom. Then measure a standard amount of water in a measuring cup (i.e. 500 mL). The volume of water doesn't matter; it just needs to be the same for every trial!
5. Pour the water into the can and record how long it takes for the water to disappear into the ground completely. Record the time in seconds on your worksheet or blank piece of paper.
6. Repeat the test on the same surface for Trial 2. Record your answer.
7. Calculate average absorption time for Surface 1 using the equation provided. Record your answer.
8. Repeat Steps 4 -7 for two more surfaces.
9. Compare the data to see which surface allows water to disappear fastest. How does infiltration of your surfaces compare to the infiltration of concrete? We want water to go into the ground quickly so it doesn't puddle or runoff the surface, which can lead to erosion and pollution.

Resources:

Video, Measuring soil infiltration rates:

[https://www.youtube.com/watch?v=9KSdT-FHA_E4]

Helpful definitions:

Infiltration: Infiltration means water being soaked up by the ground.



Activity 12: Soil as Sponges

Volume of water: _____ mL

	Time to absorb (in seconds)		Average time = $\frac{\text{Time in Trial 1} + \text{Time in Trial 2}}{2}$
	Trial 1	Trial 2	
EXAMPLE Sand	7	5	$\frac{7 + 5 \text{ seconds}}{2} = 2 \text{ seconds}$
Surface 1: _____			
Surface 2: _____			
Surface 3: _____			

Which surface had the fastest absorption rate? _____

Why is a faster absorption rate good? _____



Activity 13: Mapping Your Neighborhood

Short Description: Draw a map of your neighborhood, take a walk, and look for **gray and green infrastructure** such as raingardens, rain barrels, permeable pavement, and bioswales. Label them on the map.

Background:

Stormwater runoff is managed by both gray and green infrastructure. **Gray infrastructure** is what we consider traditional stormwater management and includes storm drains and roof gutters. Gray infrastructure does not treat stormwater runoff and carries it, along with all of its pollutants, directly into Puget Sound.

Green infrastructure is a great alternative to gray infrastructure because it collects and removes the pollution before it reaches our waterways. Green infrastructure includes raingardens, bioswales, and rain barrels. **To learn more about gray and green infrastructure, watch the video below!**

Materials:

- Pencil or pen
- Paper
- Gray and green infrastructure reference sheet
- Clipboard or other hard surface to write on (optional)

Directions:

1. Draw a map of your neighborhood. Your map could include just your street or a few blocks. Don't forget to label where your house is on the map and the street names so you don't get lost!

2. Look at the gray and green infrastructure reference sheet below. Look at what types of infrastructure is on there. There is some green infrastructure, such as raingardens and rain barrels, and also types of gray infrastructure including storm drains and gutters. We recommend printing the reference sheet out or downloading it on a phone so you can take it with you on your walk.
3. Now for the fun part! Gray and green infrastructure can be found all over, you just have to look for it! With your map and reference sheet in hand, and hard surface if you're taking it, walk around your neighborhood and mark the location of the gray and green infrastructure you see.

Resources:

Video, Polluted Puddles - Arlo's quest to clean up our mess:

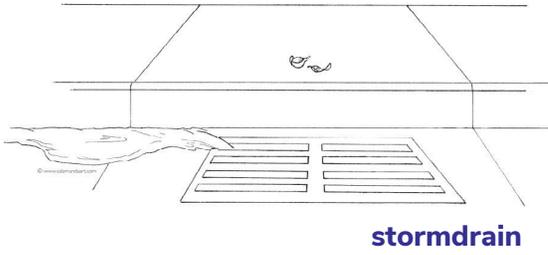
[<https://www.youtube.com/watch?v=y-su1qYSAsBU>]

To see if any green infrastructure is near you, visit: [<http://www.soundimpacts.org/>]. Note that this map **does not** include every green infrastructure feature.

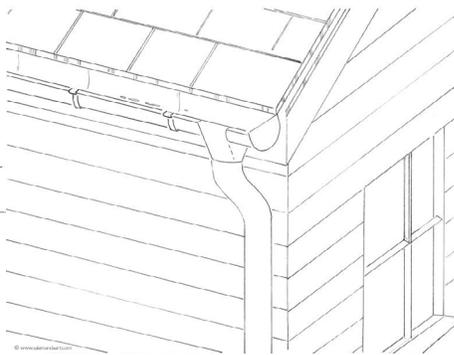


Activity 13: Mapping Your Neighborhood

Gray Infrastructure



storm drain



roof gutter

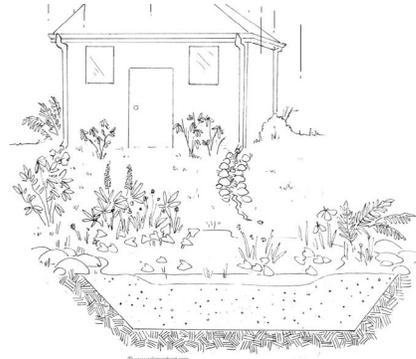


drain to waterway

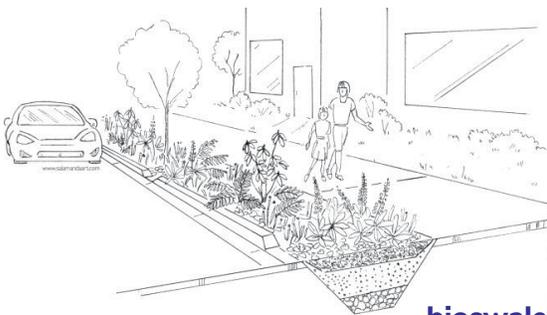
Green Infrastructure



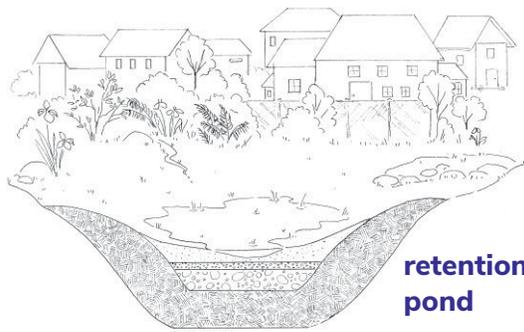
raingarden



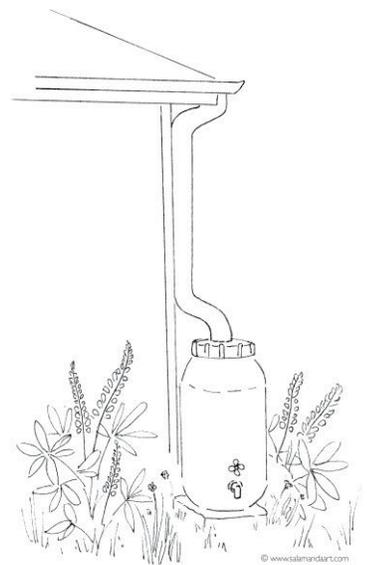
raingarden



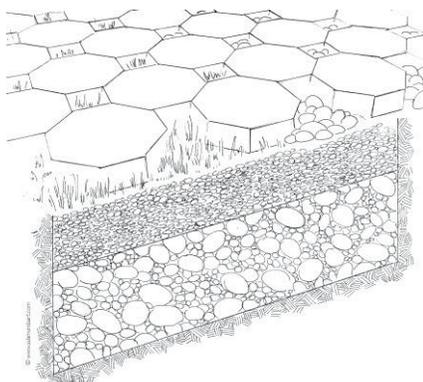
bioswale



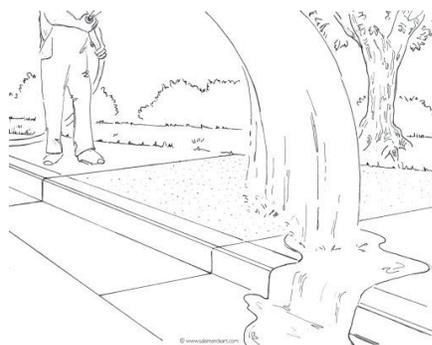
retention pond



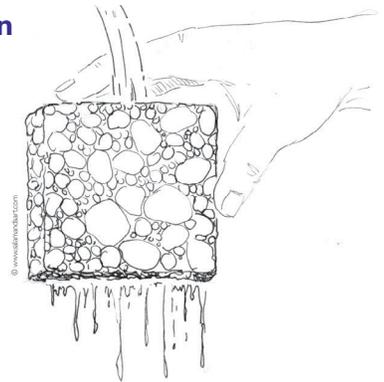
rain barrel



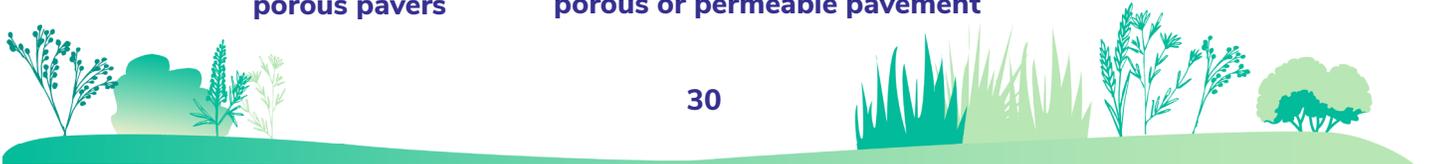
porous pavers



porous or permeable pavement



porous or permeable pavement



Helpful Definitions

Bioswales: Bioswales, or swales, are vegetative ditches that capture and treat polluted stormwater runoff.

Gray infrastructure: Traditional stormwater management including storm drains and roof gutters. Gray infrastructure does not treat stormwater runoff and carries it, along with all of its pollutants, directly into Puget Sound.

Green infrastructure: Nature-based solutions to treat stormwater runoff. Green infrastructure slows the runoff to clean and filter out pollutants before it reaches the storm drain and flows to our creeks, lakes, and Puget Sound. Green infrastructure includes raingardens, planted ditches (called swales or bioswales), permeable pavement, green roofs, and more.

Permeable pavement: Permeable (or porous) pavement is an alternative to concrete and asphalt pavement that allows water to absorb into the ground.

Rain barrel: A rain barrel, or cistern, is a barrel used to collect and store rainwater running off roofs. Captured water can be used to water gardens and lawns, wash your cars, etc.

Raingarden: A raingarden is a shallow bowl-shaped garden that uses soils and plants to soak up, filter and clean rainwater runoff from a nearby downspout, driveway or sump pump. Raingardens help protect our creeks by capturing rainwater before it enters a storm drain, slowing it down and allowing it to absorb into your soil.

Stormwater runoff: Stormwater runoff is the rainwater that falls on our streets and roofs and flows into storm drains. Stormwater runoff picks up what it touches, like oil from the road, yard chemicals and pet waste. This polluted water then runs off into our creeks, lakes, and Puget Sound. Stormwater runoff is not filtered or treated to remove the pollutants and can be highly toxic to our fish and wildlife.

