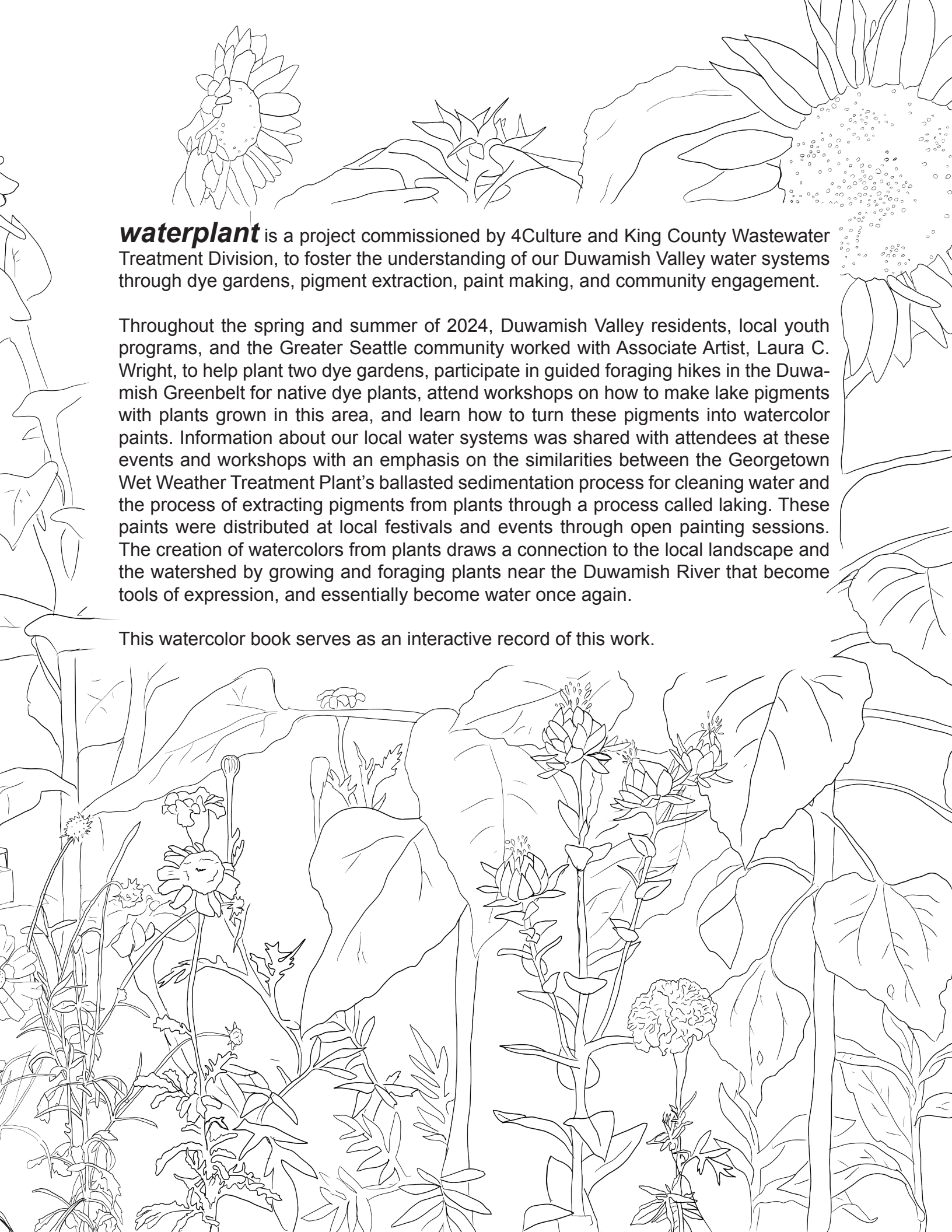


waterplant

A watercolor book for waterplant, a project fostering the understanding of our Duwamish Valley water systems through dye gardens, pigment and paint making, and community engagement.



*Georgetown Youth Council visits the dye garden at the Georgetown Steam Plant



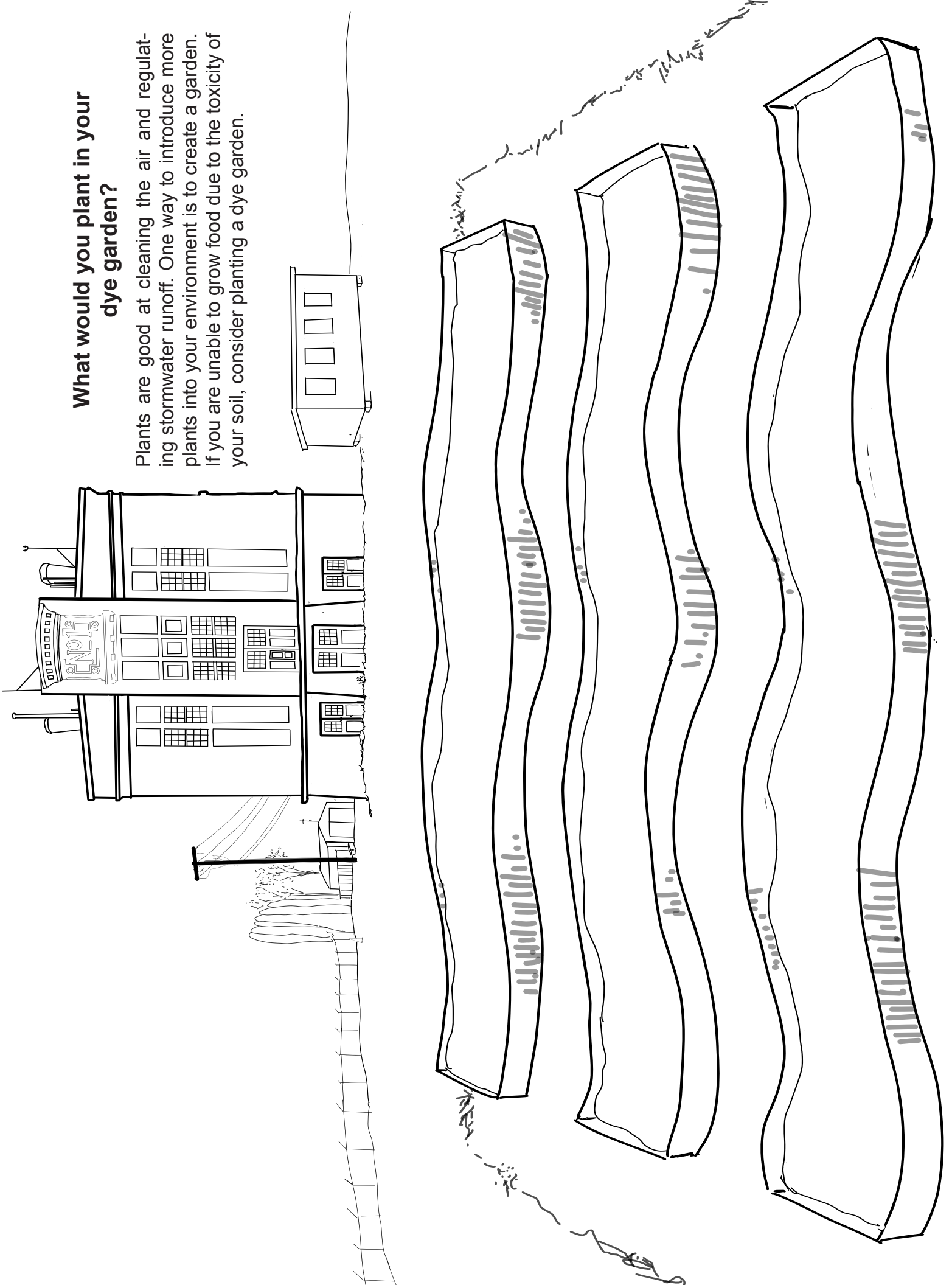
waterplant is a project commissioned by 4Culture and King County Wastewater Treatment Division, to foster the understanding of our Duwamish Valley water systems through dye gardens, pigment extraction, paint making, and community engagement.

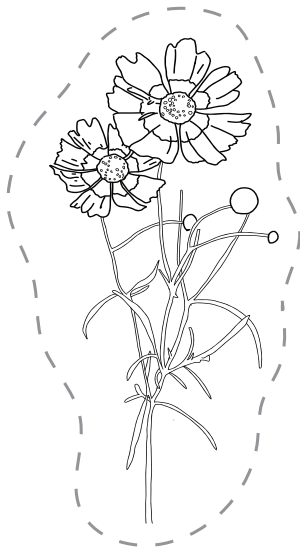
Throughout the spring and summer of 2024, Duwamish Valley residents, local youth programs, and the Greater Seattle community worked with Associate Artist, Laura C. Wright, to help plant two dye gardens, participate in guided foraging hikes in the Duwamish Greenbelt for native dye plants, attend workshops on how to make lake pigments with plants grown in this area, and learn how to turn these pigments into watercolor paints. Information about our local water systems was shared with attendees at these events and workshops with an emphasis on the similarities between the Georgetown Wet Weather Treatment Plant's ballasted sedimentation process for cleaning water and the process of extracting pigments from plants through a process called laking. These paints were distributed at local festivals and events through open painting sessions. The creation of watercolors from plants draws a connection to the local landscape and the watershed by growing and foraging plants near the Duwamish River that become tools of expression, and essentially become water once again.

This watercolor book serves as an interactive record of this work.

What would you plant in your dye garden?

Plants are good at cleaning the air and regulating stormwater runoff. One way to introduce more plants into your environment is to create a garden. If you are unable to grow food due to the toxicity of your soil, consider planting a dye garden.

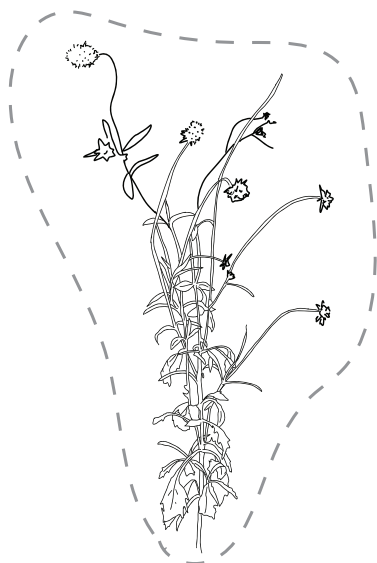




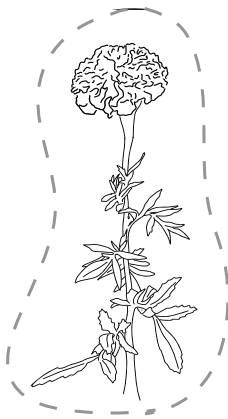
Dyer's Coreopsis
Coreopsis tinctoria



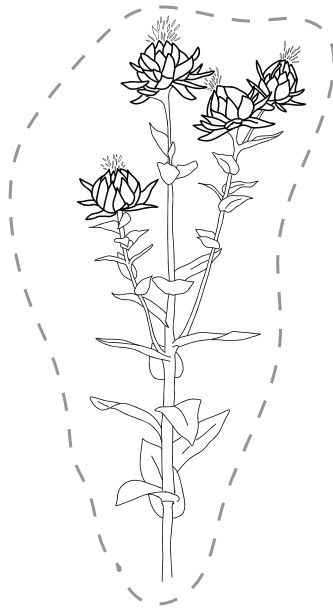
Dyer's Chamomile
Cota tinctoria



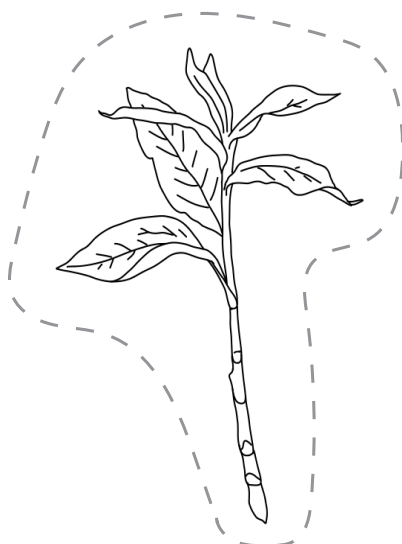
Black Knight Scabiosa
Scabiosa atropurpurea



Marigold
Tagetes erecta



Safflower
Carthamus tinctorius



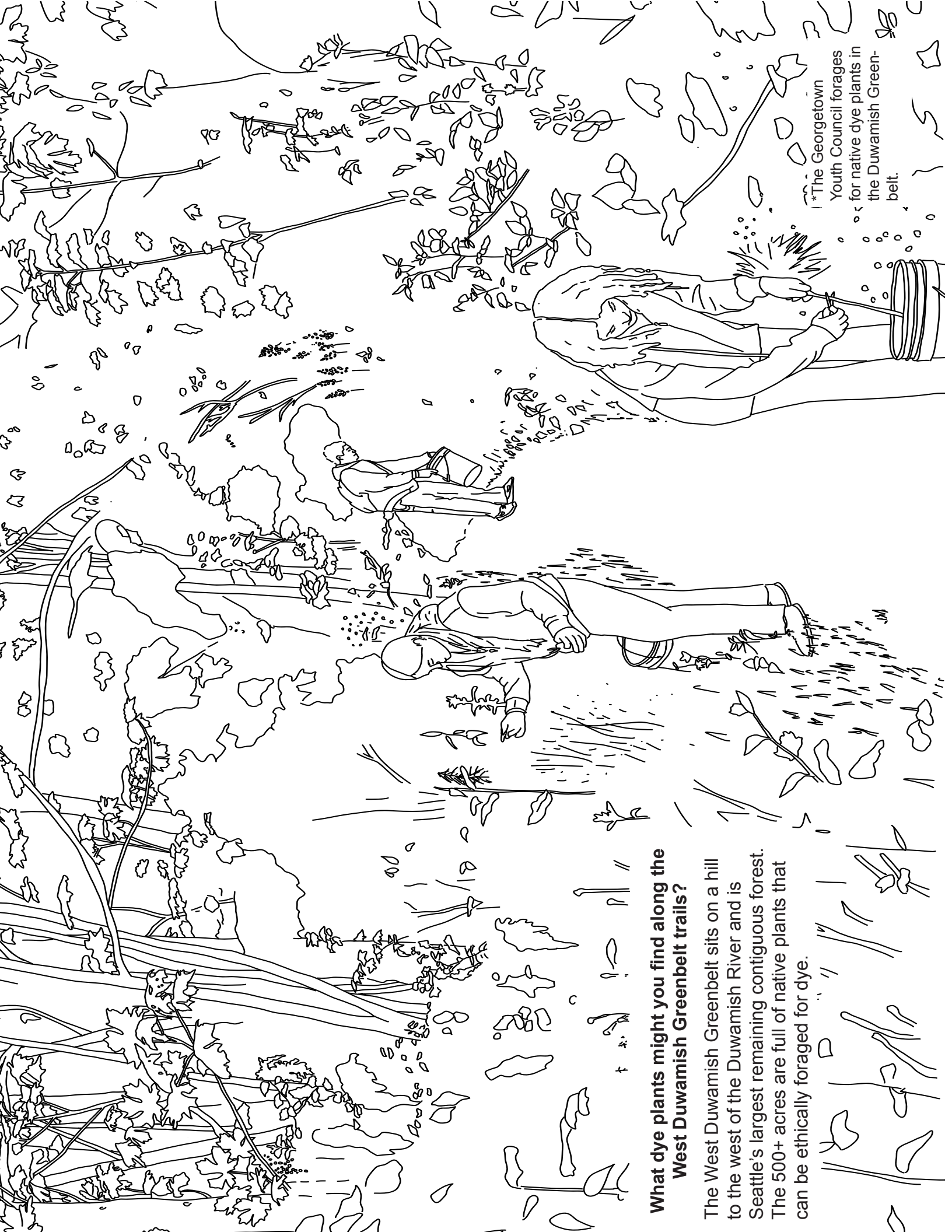
Japanese Indigo
Persicaria tinctoria

What will you plant in your dye garden?

These are some of the dye plants used around the world to color textiles and make natural pigments. Add these plants to the garden page.



Hopi Black Dye Sunflower
Helianthus annuus

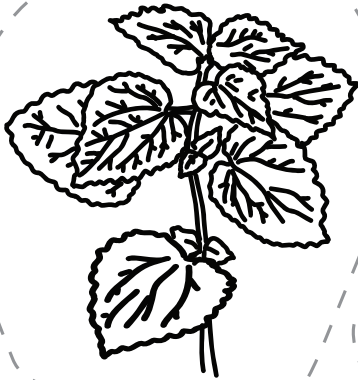


What dye plants might you find along the West Duwamish Greenbelt trails?

The West Duwamish Greenbelt sits on a hill to the west of the Duwamish River and is Seattle's largest remaining contiguous forest. The 500+ acres are full of native plants that can be ethically foraged for dye.

*The Georgetown Youth Council forages for native dye plants in the Duwamish Greenbelt.

What plants native to the Pacific Northwest can be foraged to make dyes and pigments?



Nettle
Urtica dioica



Oregon Grape
Mahonia nervosa



Yarrow
Achillea millefolium



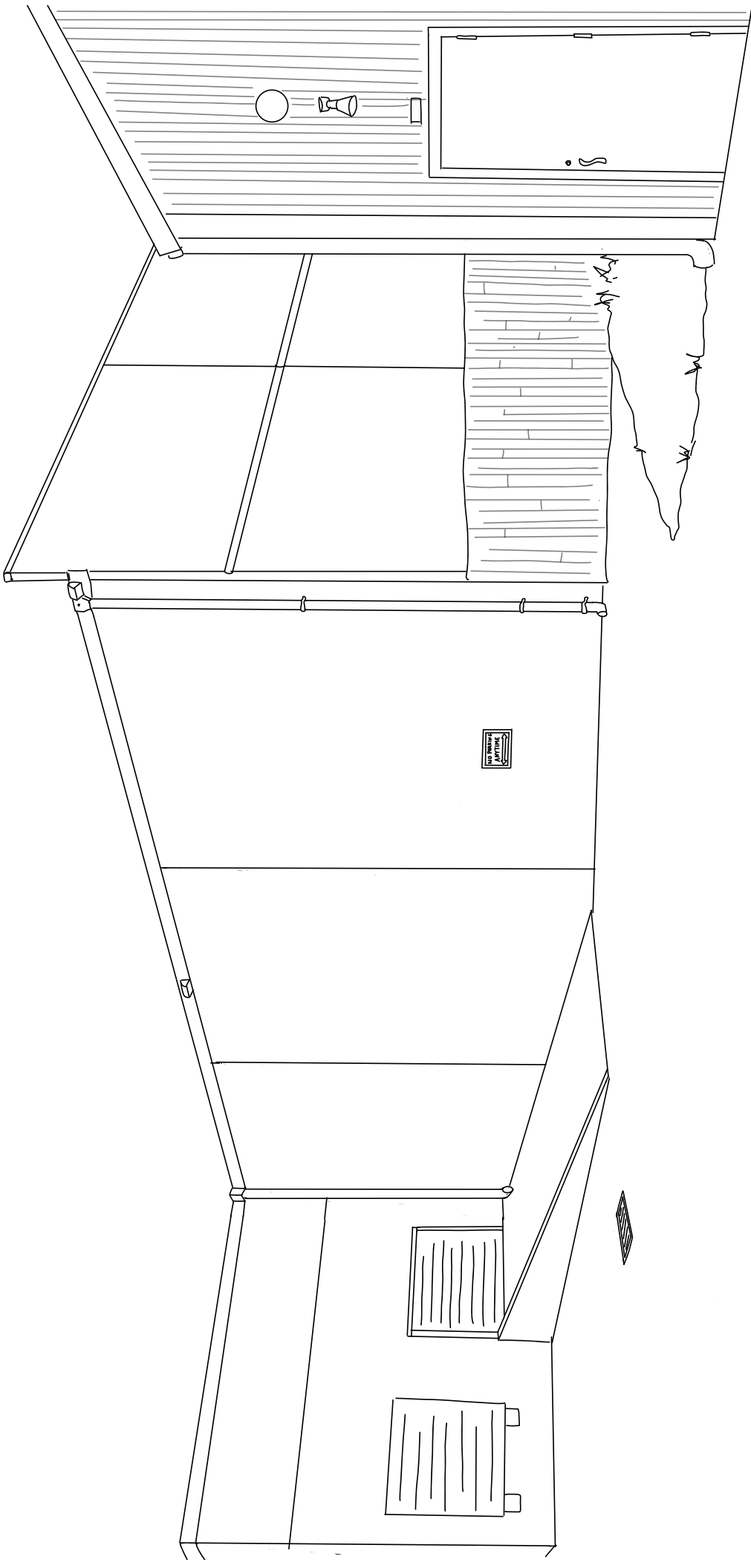
Elderberry
Sambucus canadensis



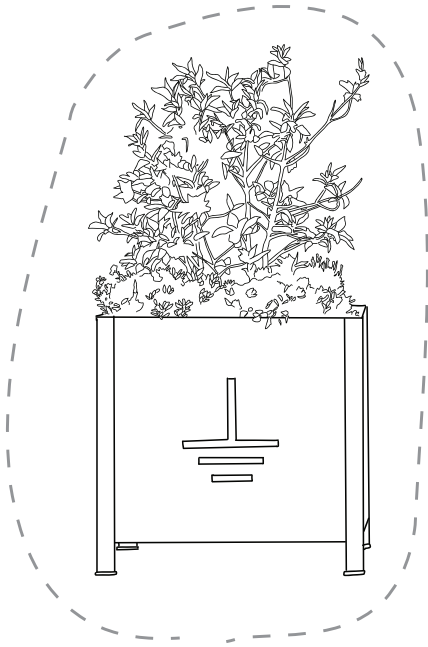
Birch
Betula pendula

What features can you add to this scene that clean runoff and slow the rainwater's journey to the river?

Most of the Duwamish Valley is paved with asphalt and cement and has one of the lowest tree canopies in Seattle. Without plants and natural surfaces to soak up the rain, stormwater floods our sewer system.

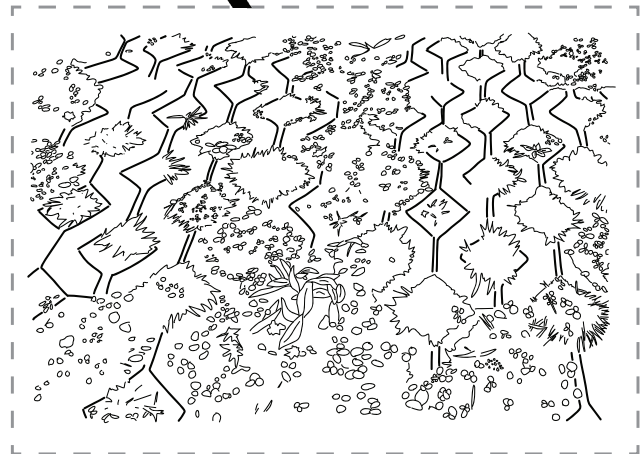
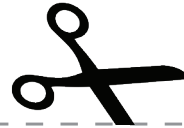


**Add these features to
warehouses and roads to
create natural areas that
absorb rainwater.**



Grattix Box

This is a garden in a box that can be placed under downspouts to filter and store water.



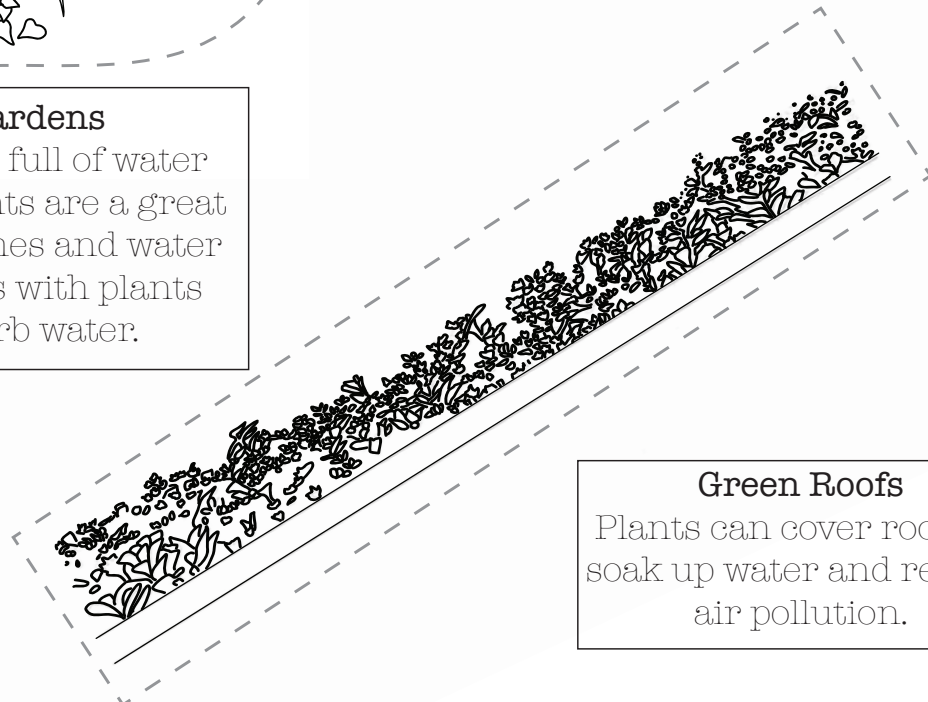
Permeable Pavement

Permeable pavement is an alternative to asphalt that allows water to be absorbed by the ground.



Rain Gardens

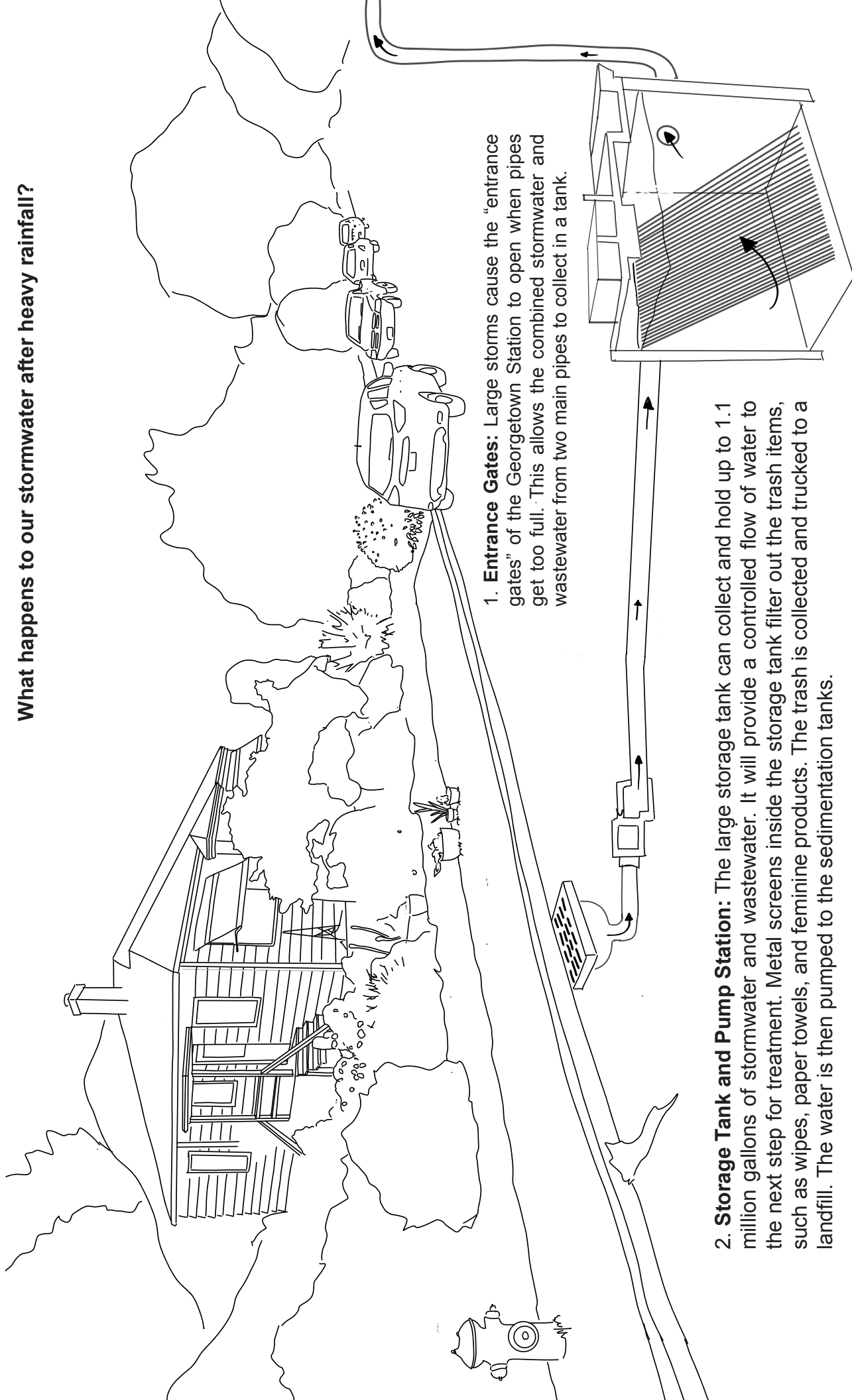
Rain gardens full of water absorbing plants are a great way to fill ditches and water logged spaces with plants that absorb water.



Green Roofs

Plants can cover roofs to soak up water and reduce air pollution.

What happens to our stormwater after heavy rainfall?

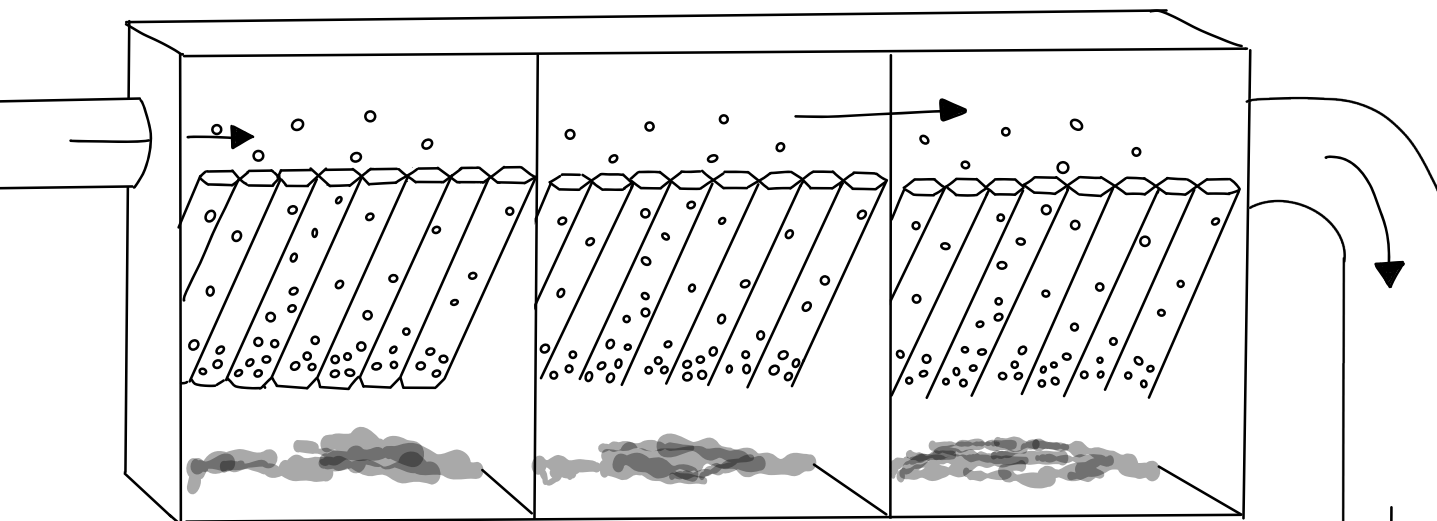


1. **Entrance Gates:** Large storms cause the “entrance gates” of the Georgetown Station to open when pipes get too full. This allows the combined stormwater and wastewater from two main pipes to collect in a tank.

2. **Storage Tank and Pump Station:** The large storage tank can collect and hold up to 1.1 million gallons of stormwater and wastewater. It will provide a controlled flow of water to the next step for treatment. Metal screens inside the storage tank filter out the trash items, such as wipes, paper towels, and feminine products. The trash is collected and trucked to a landfill. The water is then pumped to the sedimentation tanks.



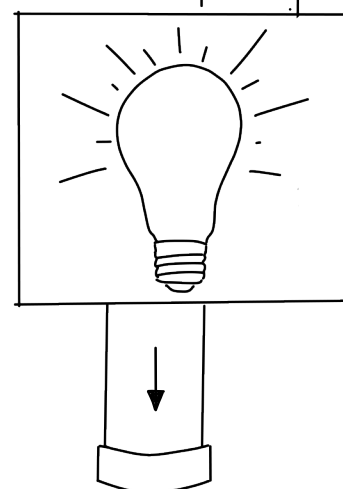
To learn more about this process and the Georgetown Wet Weather Treatment Station visit:
<http://www.kingcounty.gov/GeorgetownWWTTS>



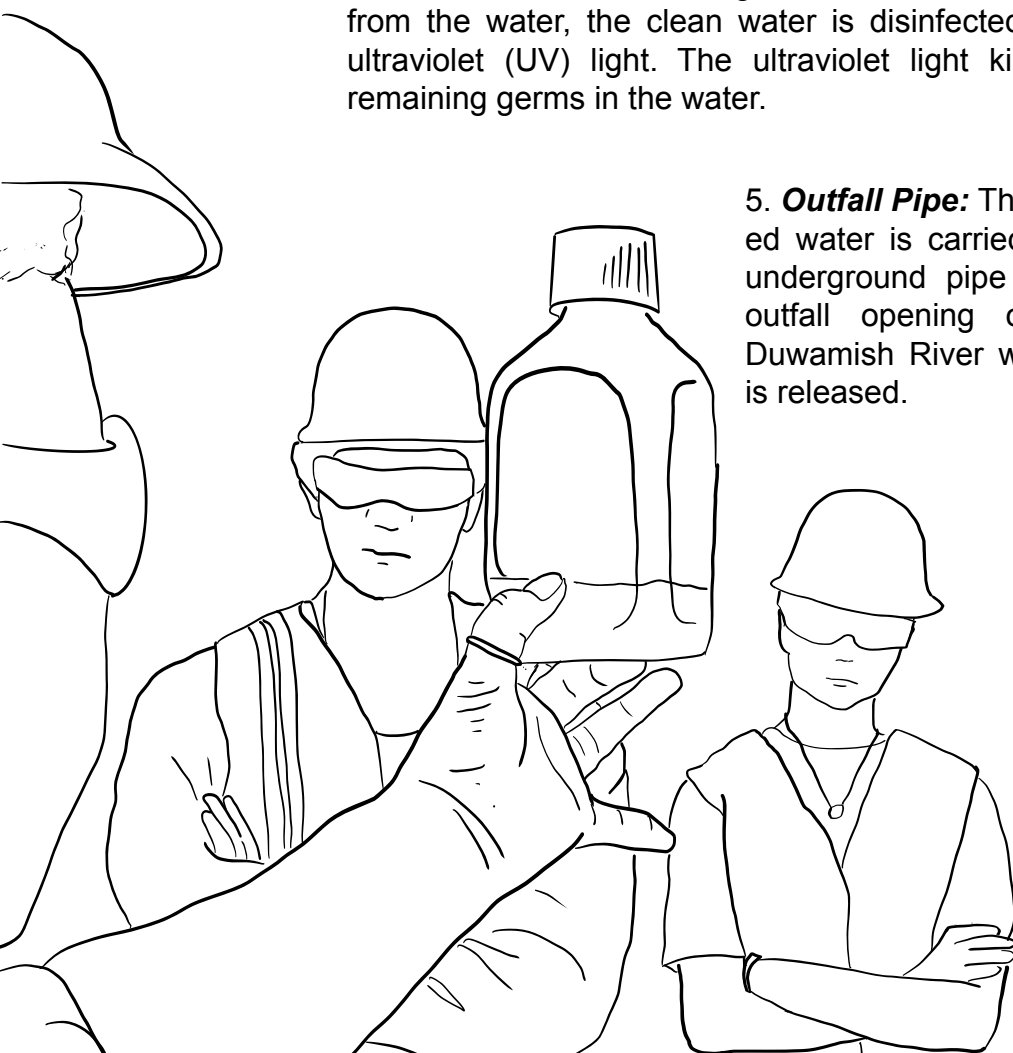
3. Ballasted Sedimentation: The next step to clean the water is an innovative process is used to remove solids. Several components (sand, polymer and coagulant) are added which help the solid particles stick together and sink to the bottom at a rapid speed. The solids are collected and pumped to a holding tank.

4. Disinfection: After the organics have been removed from the water, the clean water is disinfected using ultraviolet (UV) light. The ultraviolet light kills any remaining germs in the water.

5. Outfall Pipe: The treated water is carried in an underground pipe to the outfall opening on the Duwamish River where it is released.



Ballasted sedimentation is similar to the process of extracting natural pigments for making water-color paints!



*Ballasted sedimentation demonstration during our tour of the Georgetown Wastewater Treatment station with the Georgetown Youth Council and community members.

How to Make Natural Pigment



1. Create your dye bath.
Gather your plant material and choose one of these methods to make dye:

Solar Dye Method: Place your plants in a one gallon jar filled with water and leave it in a warm sunny place for one week.

Stove-top method: In a stainless steel pot (that you will no longer use for cooking food), simmer the plant material for one hour in water (more for dense material like bark) and then allow to cool.

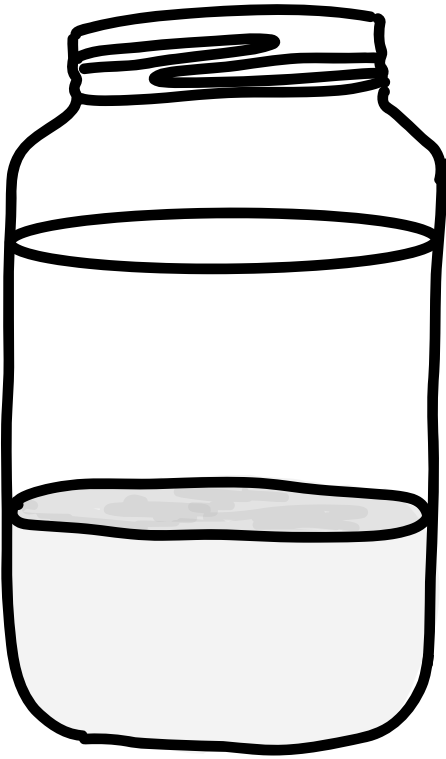




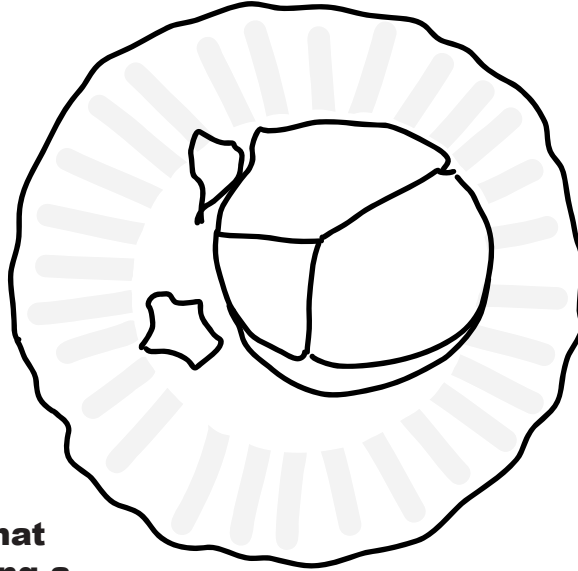
2. Strain out the plant matter and fill a one-gallon jar half way with the dye. Dissolve 30 grams of alum sulfate in hot water and then mix the solution into your dye. Wear a dust mask for this process.

3. Dissolve 15 grams of soda ash / washing soda in hot water and mix into the dye solution. Wear a dust mask for this process. The solution may foam, which is normal.

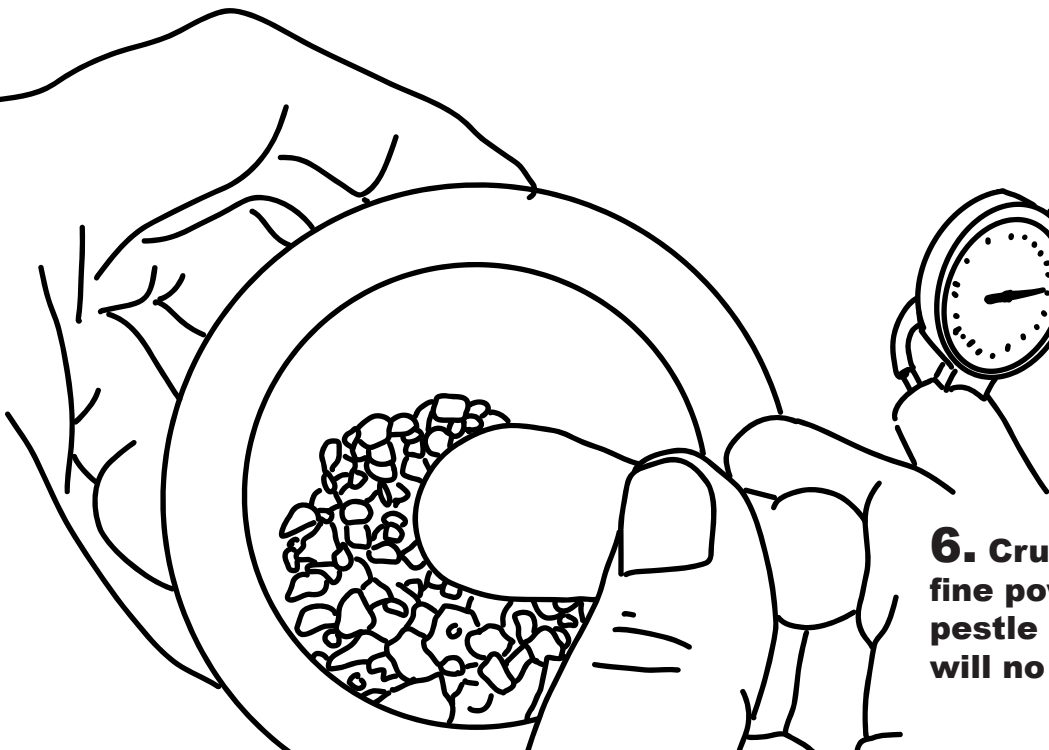
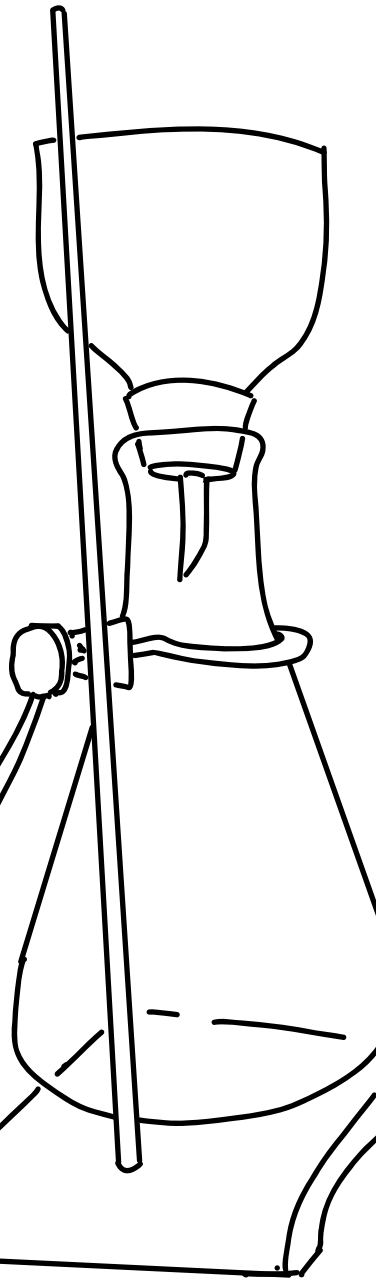




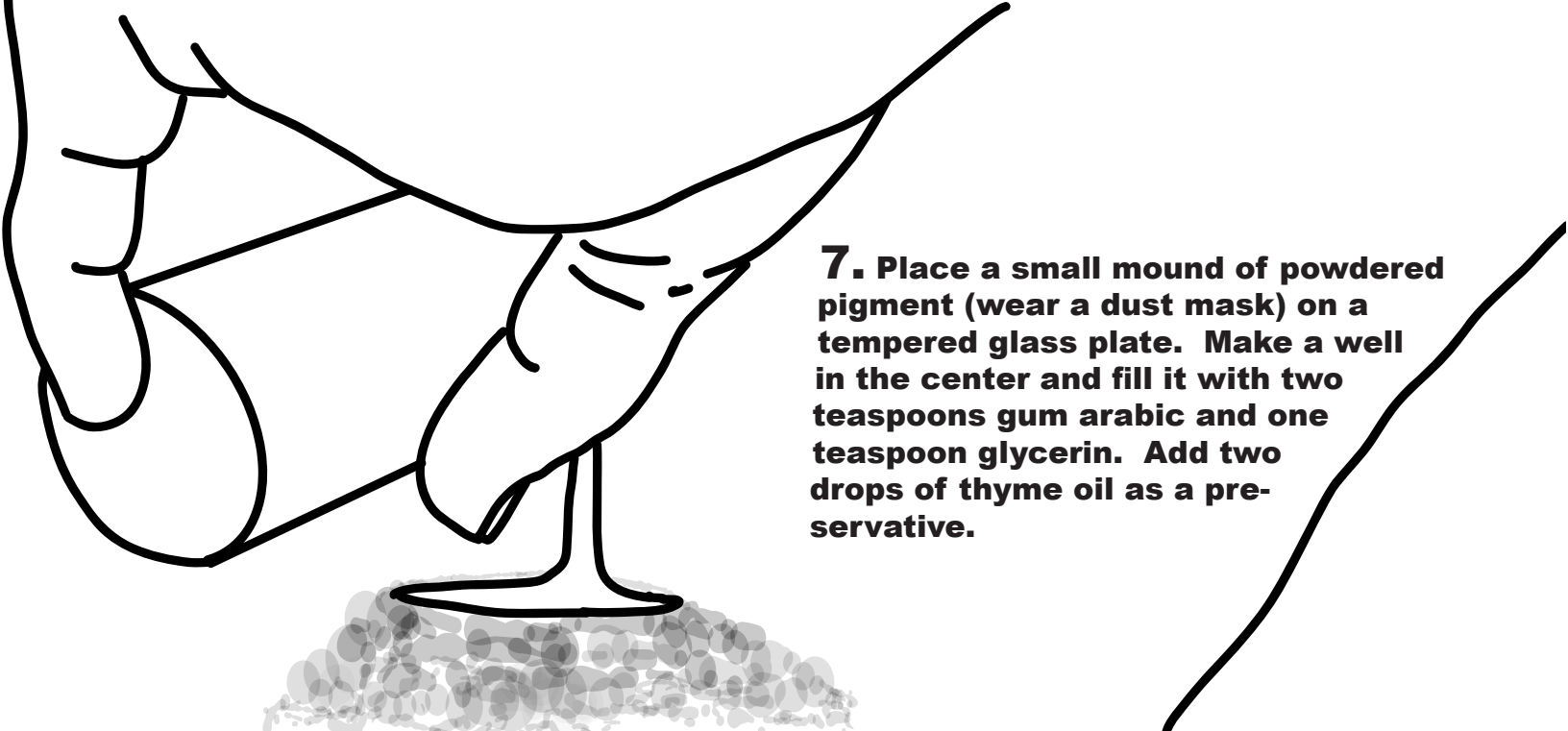
4. Let the jar sit for a day to allow the pigment to settle on the bottom. Then siphon out as much of the water on the top half as possible. A simple method for this is to use a turkey baster to gently remove the clear water on the top.



5. Filter the remaining water out of the pigment by pouring the liquid through a coffee filter (a slow process that will take a few days) or by using a Buchner funnel. Once you have the extracted pigment, let it dry in a warm place out of direct sunlight.



6. Crush the pigment into a fine powder using a mortar and pestle or a coffee grinder that will no longer be used for food.

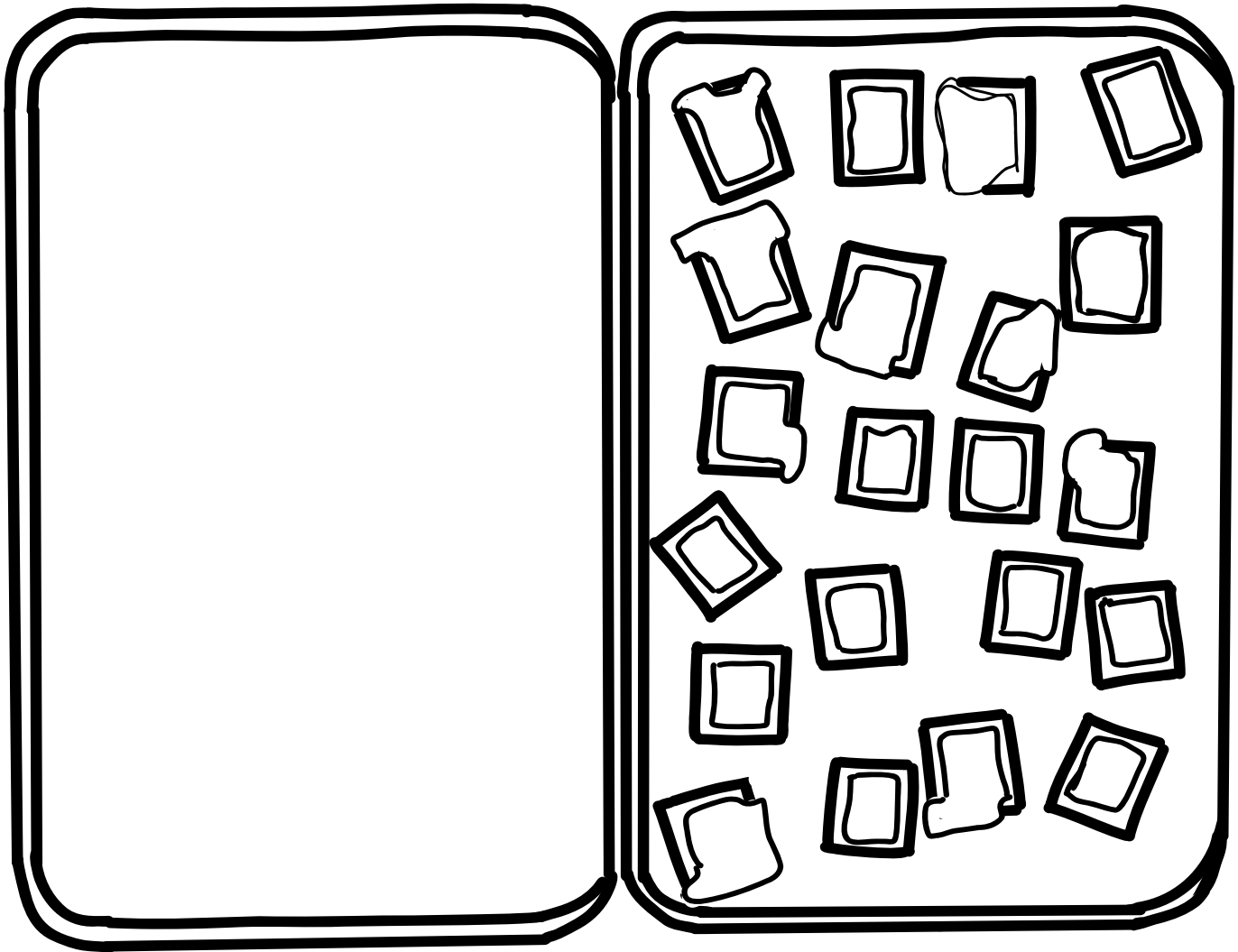


7. Place a small mound of powdered pigment (wear a dust mask) on a tempered glass plate. Make a well in the center and fill it with two teaspoons gum arabic and one teaspoon glycerin. Add two drops of thyme oil as a preservative.

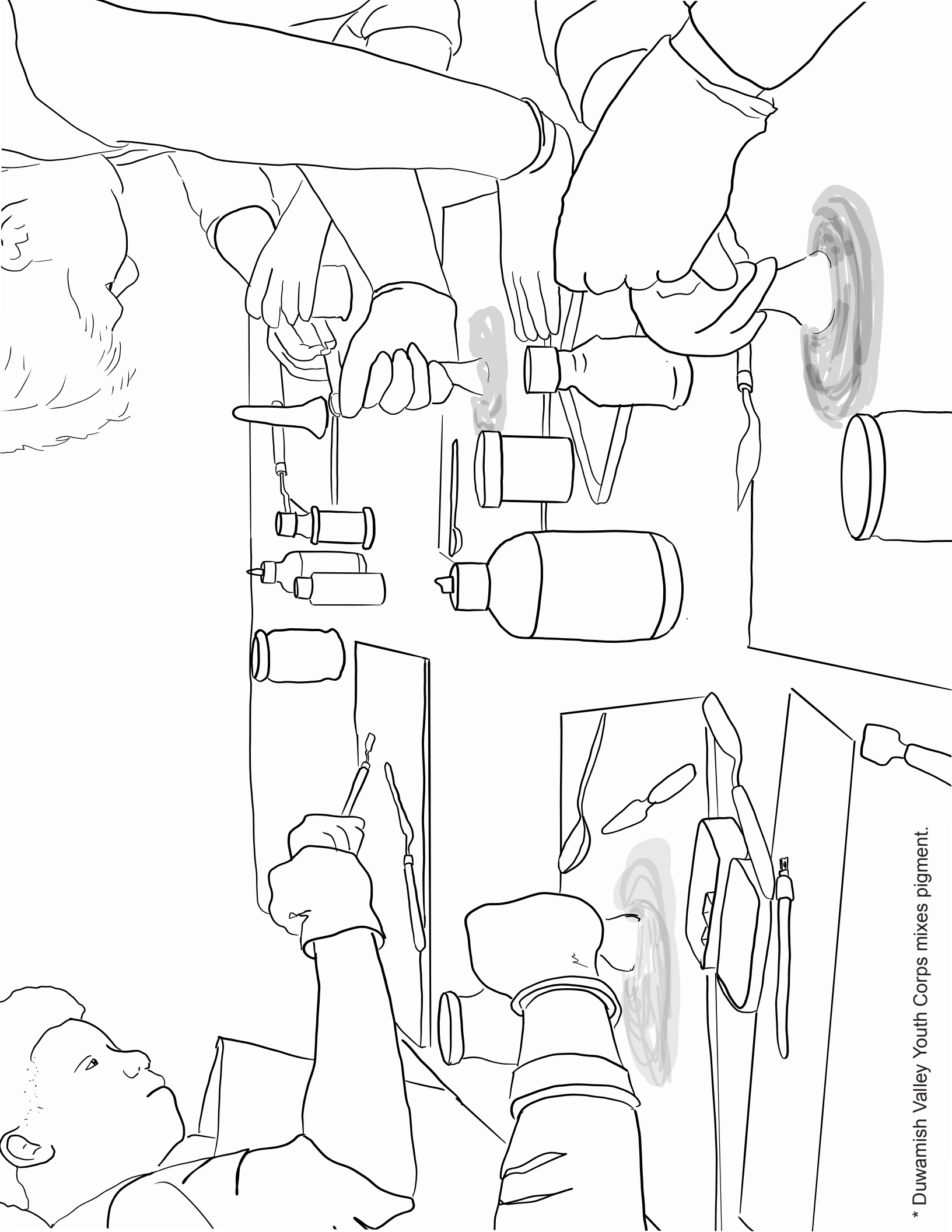
8. Use a glass muller to mix and finely grind the paint. Keep a palette knife handy to scrape up any paint and help with mixing.



9. If the paint mixture is too dry or hard to spread on the glass plate with the muller, add more gum arabic and glycerin. If the paint is too runny, add more pigment. The best way to tell if the paint is the consistency you like is to use a paint brush and water to test it on a piece of paper.



10. When you have your paint mixed to your satisfaction, scrape it together using a palette knife and add it to small containers such as bottle caps or makeup tins. Find a tin to keep them in, but store them with the lid open for a few days to let the pigment harden. Now you are ready to paint!



Special thanks to the following for their help and contributions:

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* Drawings based on photographs by Timothy Aguero www.aguerophoto.com

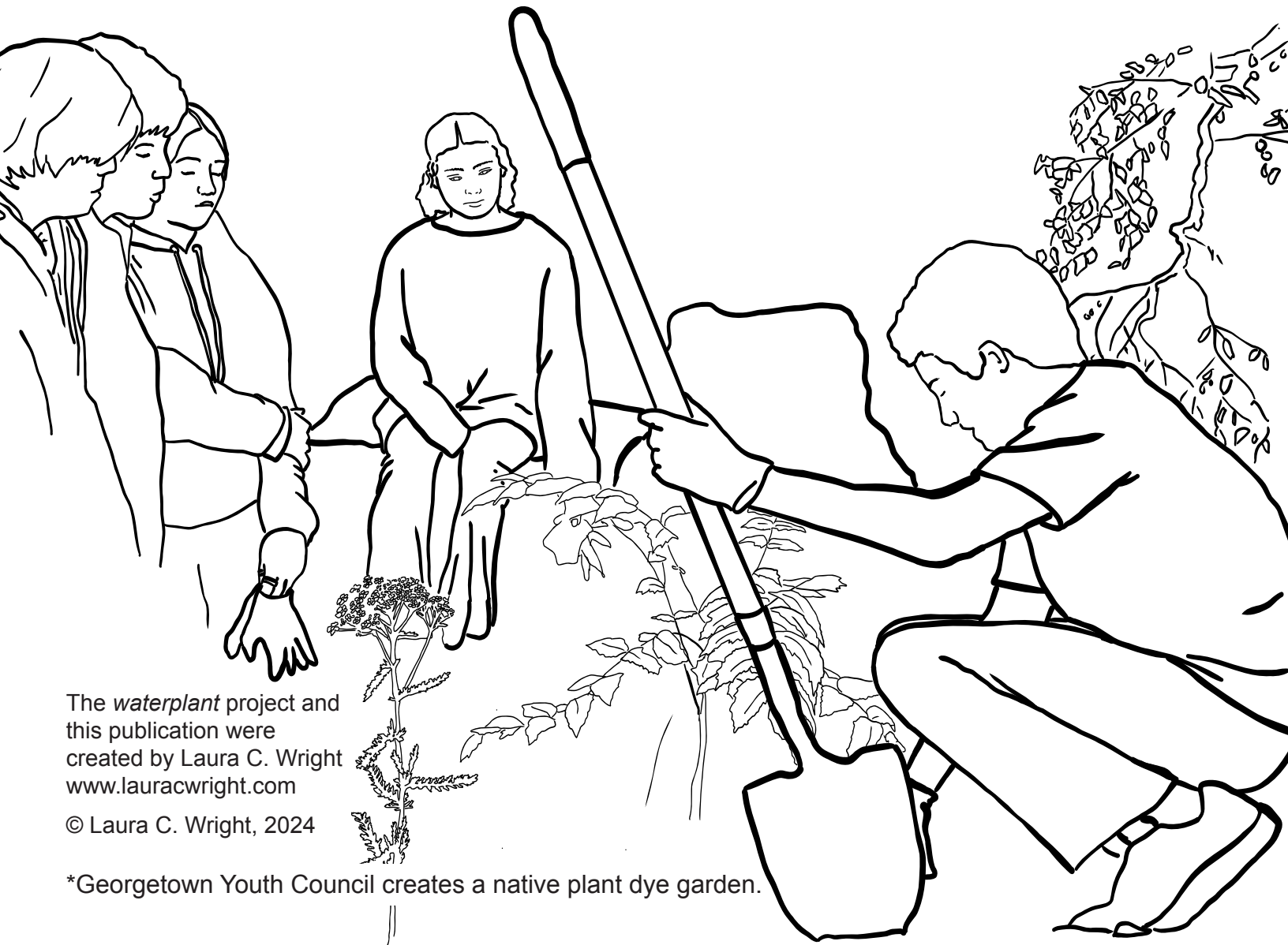


King County

Wastewater Treatment



CULTURE



The *waterplant* project and
this publication were
created by Laura C. Wright
www.lauracwright.com

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*Georgetown Youth Council creates a native plant dye garden.