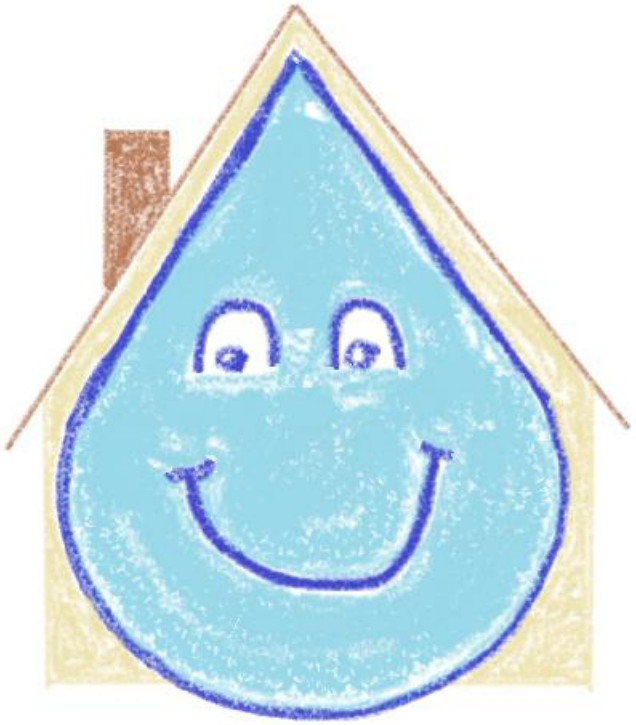
# Home Rain Drain Project

By Skagit Watershed Council, April 2020, adapted from the Drain Rangers curriculum for 5-6th graders who are staying home and staying healthy



Home Rain Drain Project

SKAGIT WATERSHED COUNCIL
A Community Partnership for Salmon

By doing this project, you will be studying how your home impacts your watershed. If your home is part of a bigger building, like an apartment or a duplex, for activity #2, you will be studying the impact of the whole building. If your home is not appropriate for this activity (for example, if you live in a traveling circus or on a boat), you can use a public building like a library or a small local park. Please practice social distancing and use common safety sense while doing this project.

We recommend doing this project over several days.

**Students who share their work with us will receive a special prize!** By sending your project, you are giving us permission to share your work as well as your first name, age and the city where you live. No other personal information will be shared. A submission form is on page 10.

**Background information:**

A **watershed**, also called a drainage basin, is all the area of land that drains into one body of water. This video illustrates how watersheds work. Large bodies of water have a large watershed, made of smaller watersheds. For example, the Salish Sea watershed includes much of the land in northwestern Washington and southwestern British Columbia. Every river that flows into the Salish Sea has its own watershed. In Skagit County, we live in/near the Skagit River watershed. If you'd like to better understand how watersheds work and how students like you have helped scientists study them, check out this fun video.

For most people, water from heavy rains (called **stormwater**) drains off their home quickly and is brought to a river or lake through storm drains. All the stormwater that makes it to the river or lake (i.e. stormwater that is not soaked up by soil/plants or evaporated back into the air) is called **stormwater runoff**. The more **impervious surfaces** (surfaces that do not let water soak through, like roofs, streets, sidewalks and parking lots) there are in an area, the more stormwater runoff it will produce. Since impervious surfaces don't allow pollutants (like pet poop or chemicals from cars or homes) to filter out of the water, more impervious surfaces lead to dirtier stormwater. This video explains how soils filter out pollution.

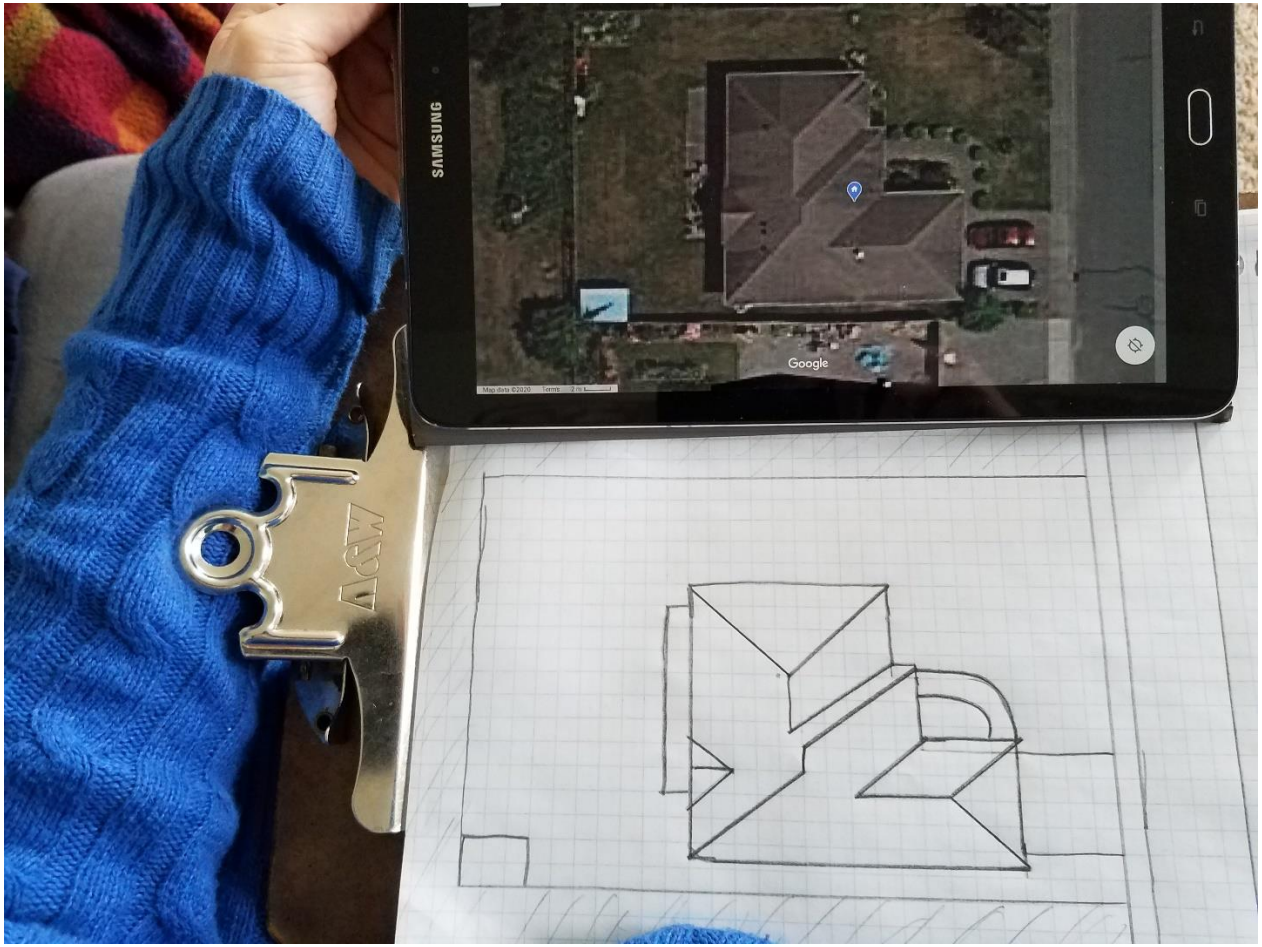
**Activity #1 – Thinking about the problem**

Watch this video and this one too. Write down your answers to the following questions and/or discuss them with your family:

1. Why is stormwater runoff a problem for…
    a. People who depend on water for drinking, cleaning, recreation and beautiful scenery?
    b. People who live in or near the floodplains of a river, like the Skagit?
    c. Shellfish farmers, who raise filter-feeding clams and oysters in our bays? (hint: shellfish beds often must be closed right after the first heavy rain after a dry spell because the shellfish are not safe for people to eat at that time)
    d. Animals, like salmon, who depend on water that is clean, clear and cold to be healthy and strong?
2. What are some sources of stormwater pollution near your home that you can see? What are some sources that maybe you can't see (even if stormwater is clear, it can be carrying harmful chemicals)?
3. What are three (or more) ways you, your family, or your neighborhood could help keep the water near you clean?

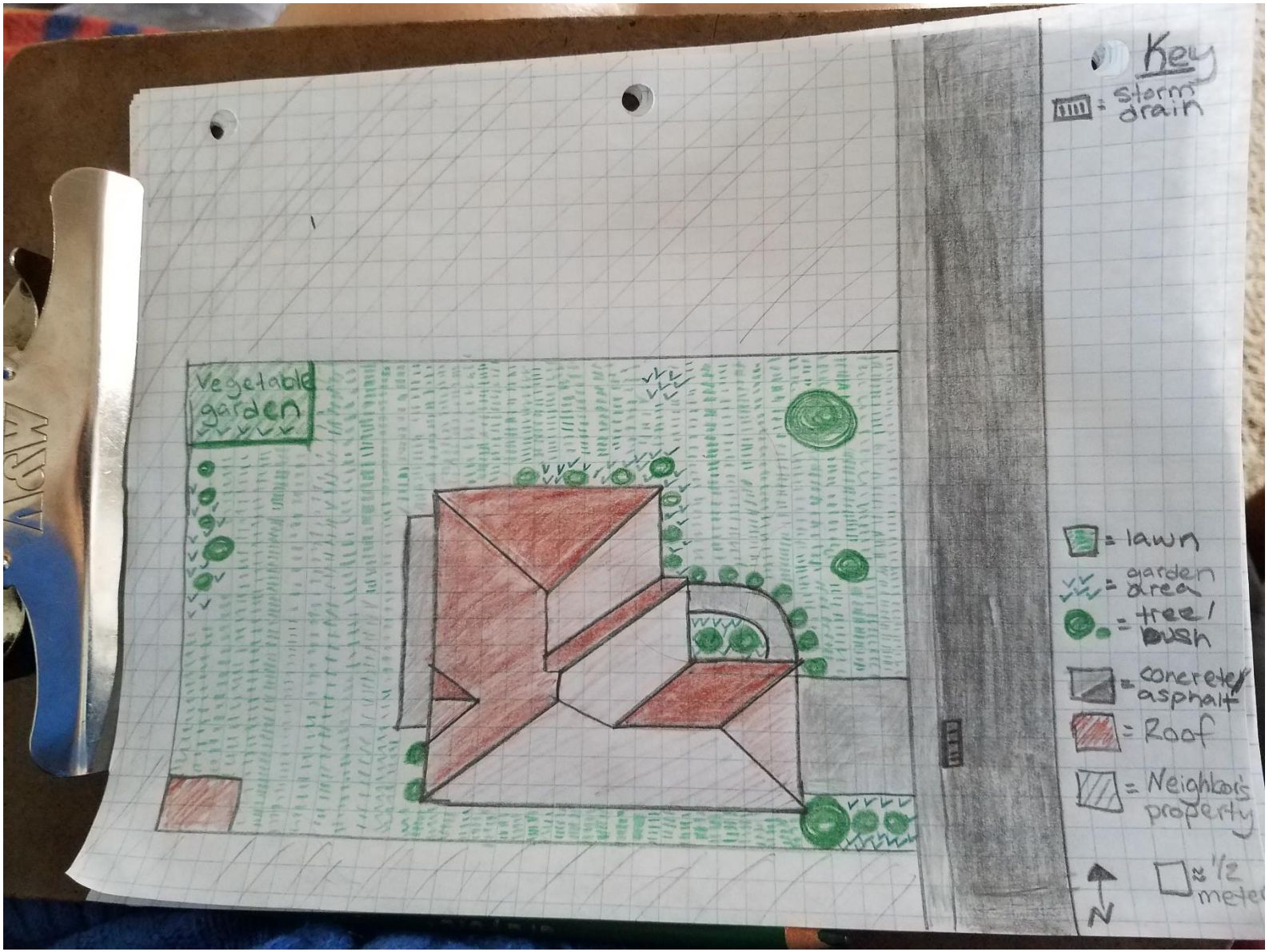
**Activity #2 – Studying how rain drains from your home**

1. **Draw what your home would look like to a raindrop** above your home on a printout of page 8. If you don't have a printer, you can do this on a blank sheet of graph paper – be sure to include enough space for the key. Include in your drawing the entire roof for the building you live in as well as all the land between your home and the nearest storm drain. If you have a small pond (or an area that becomes one when it rains hard) near your house, it would be good to include that too. We recommend basing your drawings off satellite images from Google Maps.
   Example:

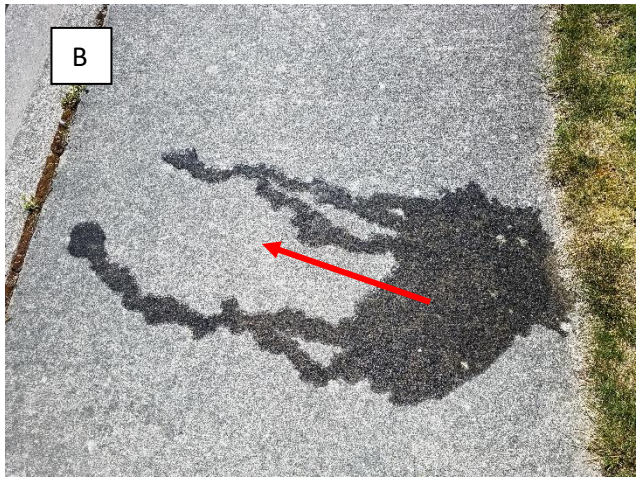


2. **Color your drawing.** Use the blank space in the key to make notes about what the colors/shapes in your drawing represent.

Example:

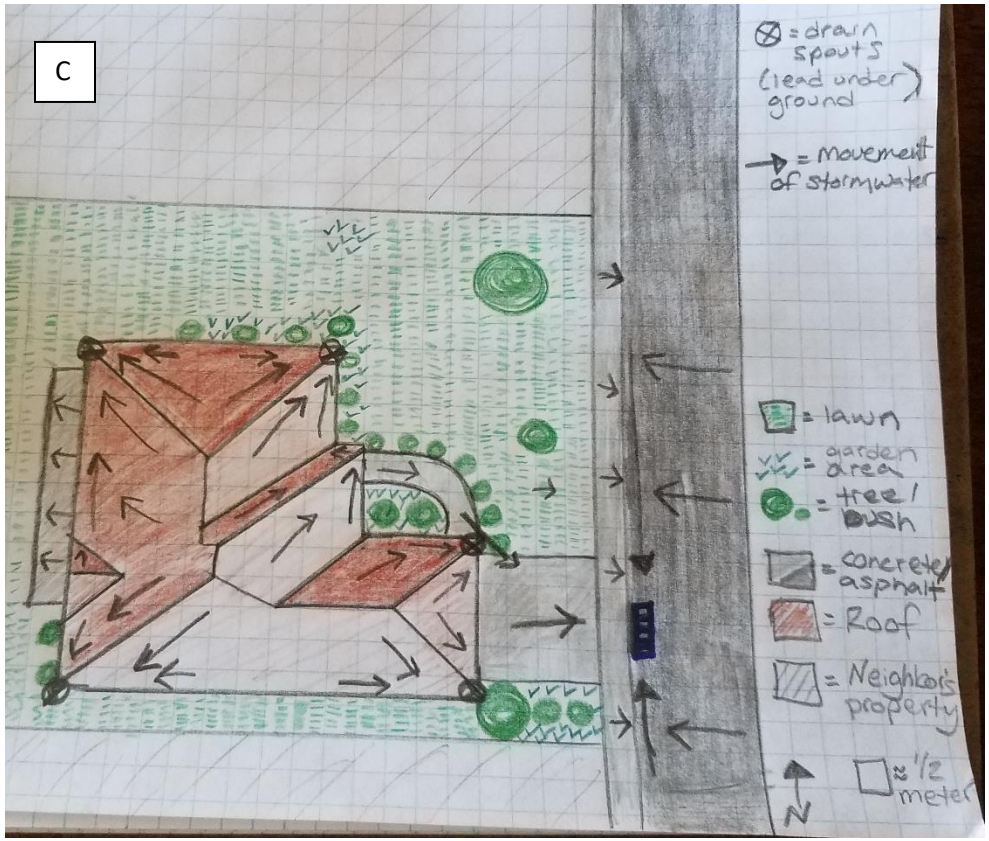


3. **Study how rainwater flows around your home.** It is easiest to do this while it is raining. You can also use tools like a garden hose, cup of water or a level to help you discover where stormwater would flow in different parts of the property. Image "A" is an example of how to use a level. A yellow line is pointing to the level's bubble, which is to the left side of the black line printed on the glass tube. The bubble will always be in the opposite direction as water flows so we know that "downhill" (where water flows) is to the right of this image. Image "B" is an example how to use a cup of water to give us the same information. The cup was poured where the blunt end of the red arrow is. The water flowed downhill in the direction the arrow is pointing. On your map, add arrows to your drawing to show where water flows.


Hint: the arrows should always point "downhill".

Don't forget to show where drain spouts move water from your roof. Image "C" is an example of how your map should look.



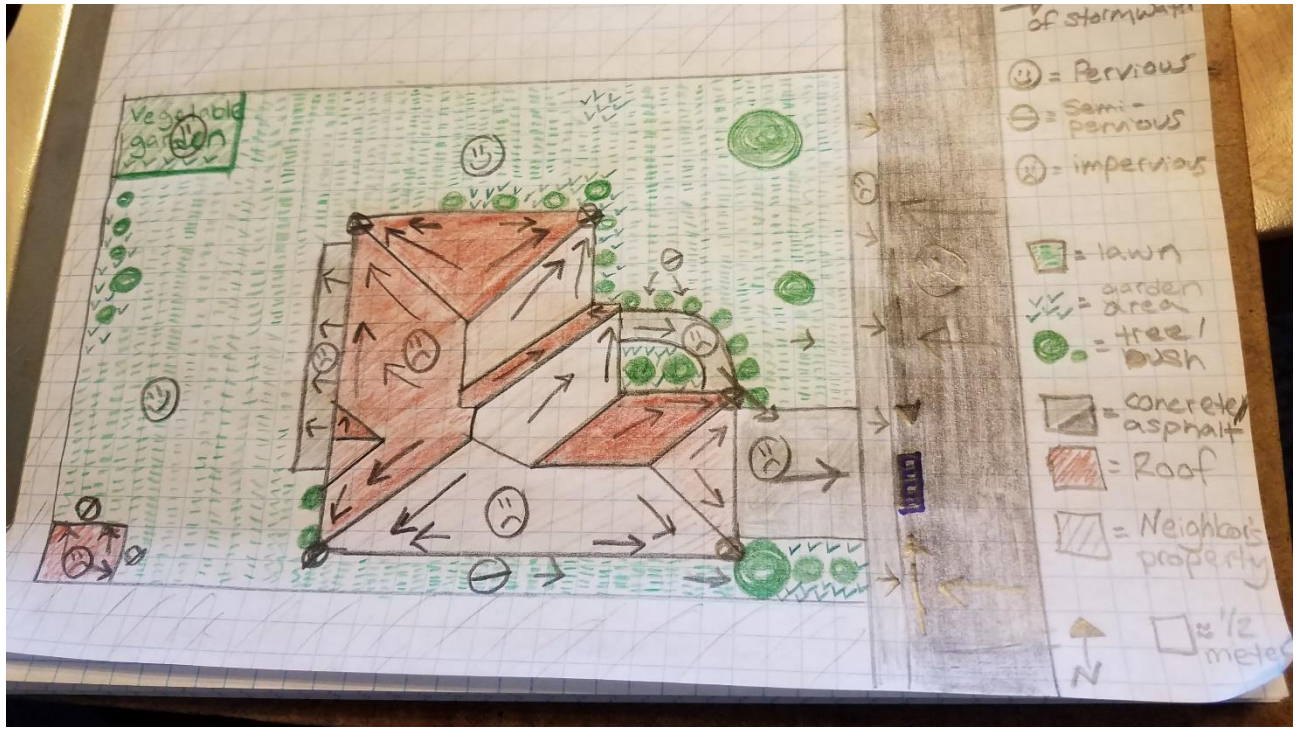

Note: In the process of doing the example of this project, it was observed that the drain spouts went underground. An internet search indicated that the water from the roof goes directly to stormwater pipes underground.

4. **Study how rainwater drains in your home**. Use the bottom three symbols in the key on page 8 to mark on your map how well different surfaces drain water in your study area. Use this test for the different types of surfaces in your study area:
   - **a.** Fill measuring cup with exactly one cup of water.
   - **b.** Slowly pour the water onto the surface you are studying while counting to 30 (or you can use a stopwatch for 30 seconds). If possible, pick a flat study area so the water doesn't all drain away.
   - **c.** Feel the area where you pour the water (or where the water moved). If water is pooled up, it is not a pervious surface!

   If all the water is absorbed in the surface and the area feels dry or like a damp sponge, the surface is **pervious.** If some of the water absorbed, but it is wet when you feel it, the surface is **semi-pervious**. If it doesn't seem that any of the water was absorbed, the surface is **impervious** (Follow the links to see video examples).

   Note: For the sake of safety, *do not check your roof*. Rooves are designed to not let water drain through them, so you can assume they are impervious

   Example:




Note that some grassy areas are pervious, and some are semi-pervious. The semi-pervious areas on this site have more compact soil because they are walked on more frequently.

**Activity #3 - Calculate how much rainwater drains over your parking area each year**

Follow the steps on page 9 to calculate how much annual rain flows over an area where a car could park near your home. You can use a driveway, uncovered parking stall, or spot on the road big enough for a car to fit. *Please be careful around vehicles!* Make sure you are visible to all people who could be in the area.

**Activity #4 – Think about improving water quality**

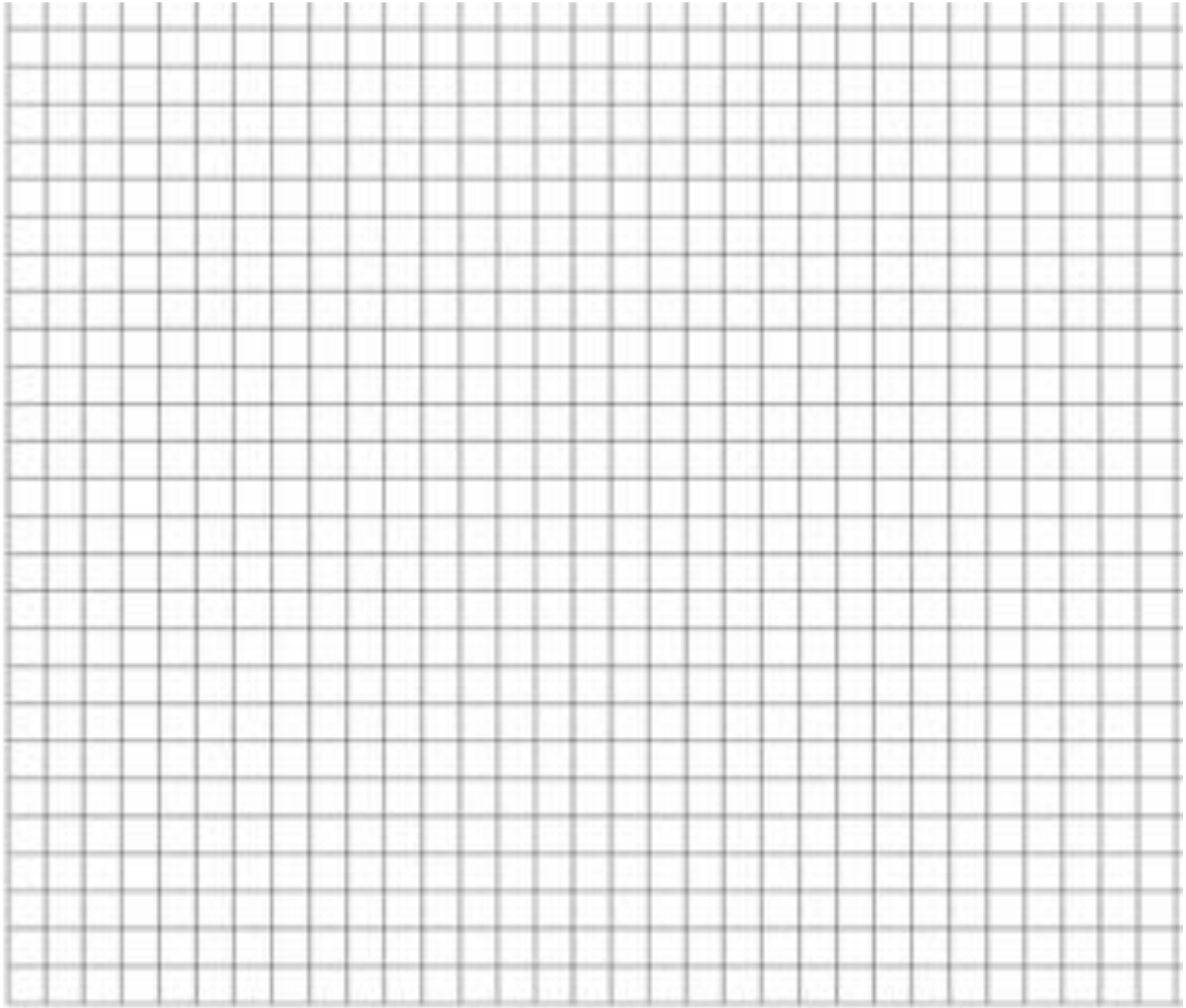
Stormwater runoff is the number-one source of pollution in the Salish Sea. There are two main pathways to try to reduce stormwater pollution: 1) reduce the amount of pollution that stormwater can pick up or 2) filter the stormwater before it makes it to the river/sea. This video was made by a group of students who used the first pathway. They reduced the amount of pollution that stormwater could pick up by asking their family and neighbors to change the way they did things like wash their car or manage their lawn. The video on this page shows how environmental engineers approach stormwater runoff using the second pathway. Here is a project some students did in their school using the same process.

Your task is to brainstorm *at least 8* different ways (including both pathways) that you, your family, and/or your community could reduce stormwater pollution. You are encouraged to draw from your experience doing activity #2, but your solutions can also take place in any public place, like a school or church. Then, decide which solution you wrote down was best and write a short essay (100– 150 words) about what your solution is and why it would work.

Here's an example essay from the home example in assignment #2:

"When I studied how water runs off my home, I discovered that parts of my yard don't drain well because the soil is compact. If I could make these areas more pervious, it would reduce stormwater runoff from my home because more water would soak into the ground and less water would go down the storm drain. I will work on these areas to physically loosen the soil and add compost. I estimate my project would prevent about 4 hot tubs worth of potentially polluted water from entering the Salish Sea each year! I chose this method over the others on my list because I already have the supplies and it's something I can do over the weekend."

# A raindrop's view of your home



**Key**

= storm drain

= drain spouts

= movement of stormwater (arrow points downhill)

= pervious surfaces, water drains throught the surface here

= semi-pervious surface, water drains here, but slowly

= impervious surface, water does not drain through this surface

# How much water flows over your parking area in a year?

1. Find the surface area of a parking area ("**PSA"** for Parking Surface Area). Use a measuring tape* and this equation:

   PSA = Length of the parking area (in feet) X Width of the parking area (in feet). Note: one inch ≈ 0.08 ft

   PSA =_____ ft X _____ ft. Answer: _____ $ft^2$

   *If you don't have a measuring tape, use a long piece of string and a ruler

2. Find the volume of rain that covers the parking lot in a year ("**ARV**" for Annual Rain Volume):
   ARV= PSA X the average annual rainfall (in feet). Note: This area gets about 3.08 ft of rain in a year.

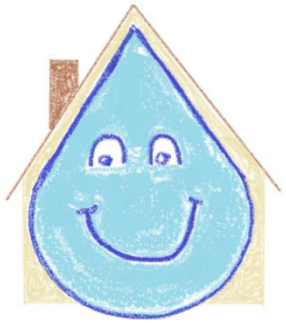
   ARV = _____ $ft^2$ X 3.08 feet. Answer: _____ $ft^3$

3. Convert your answer from #2 into gallons:
   ARV (in gallons) = ARV (in $ft^3$) ÷ 0.134 gal/ $ft^3$

   ARV (in gallons) = _____ $ft^3$ ÷ 0.134 gal/ $ft^3$ Answer: _____ gal

4. Let's have some fun with conversions! A typical hot tub holds about 400 gallons of water. Let's find your parking area's ARV is in hot tubs:
   ARV (in hot tubs) = ARV (in gallons) ÷ 400 gallons/hot tub

   ARV (in hot tubs) = _____ gal ÷ 400 gal/hot tub. Answer: _____ hot tubs



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# Submission Form for Home Rain Drain Project

Thank you for participating in the Home Rain Drain Project. We would love to see what you did and share it with our community! By submitting your project to us, you are giving us permission to share your work as well as your first name, age, and the city where you live. No other personal information will be shared.

Please fill out the following information:

Name of student: _____

Age of student: _____

Mailing address (so we can send you a prize):

_____

_____

Please include a quality photo or scan of your work (typed-out essays are welcome).

Send to Holli at hwatne@skagitwatershed.org

or

Skagit Watershed Council c/o Holli Watne
P.O. Box 2856
Mount Vernon, WA 98273

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