WHEN IT RAINS, IT POURS
Curriculum

Table of Contents

Overview

Description:

Rain is essential to our lives, especially in a region where it happens so often! These lessons will build understanding of the interactions that stormwater has with the ecosystems and communities you inhabit. These lessons are designed to help you engage in science activities you can do outside and at home with your family.

OUTCOMES

When finished with these lessons, students will be able to:

1. Relate learning to their own knowledge, interests and identity from:
    - Personal experiences
    - Prior content knowledge
    - Their community connections
2. Identify and understand problems and/or develop solutions for community-centered issues;
3. Analyze ways that people are a part of and have an impact on urban systems;
4. Apply classroom practices to real world scenarios by identifying their use of Next Generation Science Standards Science and Engineering Practices and/or Crosscutting Concepts.

OBJECTIVES

Specifically, by the end of the program students will have:

1. Built understanding of how (storm)water systems in our cities/region work and the impact they have on people and animals
2. Built understanding of how we can keep those systems healthy and why it matters.
3. Gained an understanding of how STEM can help us know our community better and help solve problems identified by the people who live there
4. An understanding that environmental issues impact some people more than others and that solutions should meet the needs of those most affected.

LESSON DESCRIPTIONS

Lesson 1: Stormwater and Me

In this lesson, we will tap into students' personal experiences with the rain, asking "what happens where you live when it rains a lot?" We'll introduce the vocabulary of STORMWATER, PERVIOUS & IMPERVIOUS through using a model and watching a short video. Students will begin to think about the problems that sometimes arise with too much stormwater runoff, including flooding and pollution; ideally they may identify a problem they've seen at their school or a place they're familiar with. Students will make a drawing (essentially a type of model) of what happens when it rains where they live, which they will add to in Lesson 2.

Focus Question: What is stormwater and how does it impact us?

<u>Concepts:</u>

- Impervious surfaces increase run off and thus increase stormwater problems like flooding and pollution;
- Pervious surfaces allow rain water to soak into the ground.
- Humans are a part of urban ecosystems; we can make differences that can help with stormwater runoff problems.

Lesson 2: Stormwater and Ecosystems
In this lesson, students explore how what is in the stormwater (and how much there is going into water bodies) affects living things aside from humans, like salmon and orcas. Students add living and non-living things (including water) to their drawing from Lesson 1.

Focus Question: How does stormwater impact our ecosystems?

Concepts:

- Clean water is important for wildlife; the health of the water can be affected by humans.
- Parts of urban ecosystems interact with stormwater in both positive and negative ways.
- Humans can alter or engineer the landscape to provide benefits.

Lesson 3: Stormwater Engineering
The focus of this lesson is applying an Engineering Design Process (EDP) to the problems students have been introduced to, in a location that's familiar to them. We'll introduce (or review) a basic EDP – Define the Problem, Develop Solutions (and consider criteria for success and constraints) and Optimize the Solution. Students will learn about a few green stormwater solutions and finish the lesson by drawing a solution for the stormwater problem they've identified.

Focus Question: How can we engineer solutions to stormwater problems?

Concepts:

- Humans can engineer structures to alter the movement and quality of water.
- Stormwater problems like flooding and pollution can be prevented through strategic use of plants and soils to slow and clean stormwater.
- Engineering involves a systematic process to solve a problem.

Materials

- **FOR ALL LESSONS**
  - Paper
  - Pencil/Pen/Colored pencils/etc.
- **PRELESSON 1**
  - **Family Interview Questions**
- **LESSON 1**
  - **Lesson 1 Jamboard slides**
  - **"When it Rains, it Pours" (VIDEO):** https://vimeo.com/238134756
  - Plate
  - Towel or sponge
  - Foil
  - Cup of water
- **PRELESSON 2**
  - **Stormwater Scavenger Hunt**
- **LESSON 2**
  - **Lesson 2 Jamboard slides**
  - **Stormwater at Alki (VIDEO):** https://www.youtube.com/watch?v=GWaI1ZLnyZM
  - **Google Time Lapse map (INTERACTIVE WEBSITE):** https://earthengine.google.com/timelapse/
  - Plate
  - Bowl of water
  - Foil
  - Cup of water
  - Small pantry or natural items (spices, sprinkles, coffee grounds, dirt, gravel etc.)
- **LESSON 3**
  - **Lesson 3 Jamboard slides**
  - **Stormwater Solutions Cards**

PRE-LESSON 1 (15 minutes)

MATERIALS:

- Family Interview Questions

FAMILY INTERVIEW

This activity invites a conversation between the student and an adult in their family about the rain to uncover memories, experiences, and family or cultural traditions and stories.

LESSON #1- Stormwater and Me (45 minutes)

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
• Asking Questions and Defining Problems • Developing and Using Models	• **ESS2.A: Earth Materials and Systems** • **ESS2.E: Biogeology** • **ESS3.B: Natural Hazards** • **ESS3.C: Human impacts on Earth Systems**	• Structure and Function • Cause and Effect • Systems and System Models

MATERIALS:

- Paper
- Pen/pencil/colored pencils/etc.
- Towel or sponge
- Plate
- Foil
- Cup of water
- Lesson 1: Stormwater and Me Jamboard slides
- "When it Rains, it Pours" video - https://vimeo.com/238134756

INTRODUCTION

Focus Question: *What is stormwater and how does it impact humans?*

Assess prior knowledge (turn and talk):

Share something you've noticed when it rains a lot where you live **(Jamboard slide 1)**.

Land acknowledgement

"We're going to learn about how people have changed the places we live, what happens to water here, and how we might want to improve the area. It's important for us to acknowledge that the history and changes we're focusing on today are really recent (50-100 years). The land and waters we all live on have been the home to Native Americans for thousands of years – from time immemorial to today. We honor and respect that long history and acknowledge the fact that the descendants of those people still live in our region today. When European settlers started moving here and building cities, they changed the land, and the amount of forest, wetlands and meadows decreased."

Unsure who were the original stakeholders of the land and water where you live? Spend some time exploring

https://native-land.ca/

to begin learning about the indigenous people of your region.

"Here is an example of some of that change **(share Jamboard slide 2).** This is what the Duwamish River in Seattle looked like before the mid-1800s **(left side of image).** This is what the land looked like since time immemorial for the Duwamish people."

Questions to consider:

- What do you notice about this map? (Point out the different colors)
- What do you wonder?

"As the we moved through the 1800s, European settlers moved in and removed many trees to begin building the City of Seattle as we know it today **(right side of image)**."

Questions to consider:

- What do you notice about this map? (Point out the different colors)
- What do you wonder?

"Much of those forests we saw is now gone, replaced by hard surfaces like roads and sidewalks. The river was even straightened to make it easier for large boats to travel on."

Visualization activity

"What happens when we change the land like this? What does that mean for us, animals, and the waters like our lakes and Puget Sound?"

"Imagine being in a place where there are a lot of trees" *(give examples that might be near you, like a park or your yard).* *"*close your eyes and imagine rainstorm …

- What do you hear? (Give time…TAKE A BREATH)
- What does it smell like? (Give time…TAKE A BREATH)
- What does the rain feel like?

"Now, let's imagine a place where there aren't many trees, and there is more pavement, sidewalks, roads, etc.

- What do you hear? (Give time…TAKE A BREATH)
- What does it smell like? (Give time…TAKE A BREATH)
- What does the rain feel like?

Questions to consider:

- What differences did you notice?

Somethings you may have noticed when picturing being surrounded by trees could be soft sounds of rain hitting the leaves, birds chirping and feelings of calm. Where there were less trees, maybe you noticed the louder sound of rain hitting the sidewalk and cars splashing through puddles.

UNDERSTANDING SURFACES BY USING MODELS

"There are 3 words that are important for us to know: **stormwater, impervious, pervious**."

Turn and Talk:

Looking at these pictures **(show Jamboard slide 3),** what do you think these words might mean?

"We are going to make a MODEL of those two surfaces to help show the difference."

Check for understanding:

- What's a model?
- Who has used a model before?
- Why might we want to use a model?

Models helps us understand something about the world but they're not always perfect. We can use many things to represent other things we see in real life. Models help us understand processes on a smaller scale.

Pervious surface demo

- The cup of water will represent STORMWATER.
    - **Define stormwater as water from rain or snow that's on the ground or rooftops.**
- Cover the plate with a towel or use a sponge. This will represent a PERVIOUS surface like grass or soil
    - What do you predict will happen to the water if it was to rain on this surface?
- Pour water slowly onto folded towel or sponge sitting on a plate and share what those things represent (plate=ground underneath the soil)
    - What do you notice? Did what happened match your prediction?
    - **Define pervious: surfaces that water can soak or absorb into.**

Impervious surface demo

- Cover the plate with foil. This will represent an IMPERVIOUS surface like a road or roof
    - What do you predict will happen to the water if it was to rain on this surface?
- Pour water carefully onto foil-covered plate (foil= pavement)
    - What do you notice? Did what happened match your prediction?
    - **Define impervious: surfaces that water cannot soak through.**

"When It Rains It Pours" video

Watch the following video to reinforce the new concepts, and to help students understand what happens when stormwater lands on these kinds of surfaces in their neighborhoods.

https://vimeo.com/238134756

STORMWATER IN YOUR NEIGHBORHOOD

"We are going to draw a picture of what happens when it rains where you live."

You'll want to show these things:

- **Impervious surfaces** (streets, roads, sidewalks)
- **Pervious surfaces** (gravel, soil)
- Things that need the rain
- Drains, gutters, or other things that help move the water
- Arrows to show which direction the water flows

Do an example drawing of where you live or the school **(prompts and example on Jamboard slide 4)"**. Give students at least 5 minutes to work on their drawing.

"Water is important! We get a lot in the northwest, and the plants and animals here need it and so do we. **(show Jamboard slide 5)"**

If you/students are able to, head outside with your drawings to help students see what is around as they map their neighborhood. There may need to be additional adult support/ supervision. Bring a bottle of water to pour onto different surfaces!

Questions to consider:

- One thing YOU like about the rain or the rainy season
- What's something from your drawing that NEEDS the rain?
- What's something you know of that lives somewhere else that needs the rain?

"We NEED the rain, but when we have TOO much impervious surface, it flows over roads and picks up pollutants, causes flooding many other problems. **(show Jamboard slide 6 and 7)"**

Questions to consider:

- Have you ever seen flooding? Or had your basement flood?
- Have you seen evidence of pollution?
- Have you seen these signs before?

CONCLUSION

"In the next lessons, we're going to spend some more time learning about how stormwater affects other living things and how people solve some stormwater problems. **Remember to save your drawing!** We will come back and add to these as we learn more about stormwater in our neighborhoods."

PRE-LESSON 2 (30 minutes)

MATERIALS:

- Stormwater Scavenger Hunt

STORMWATER SCAVENGER HUNT

This activity encourages students and an adult to walk their neighborhood in search of common things that interact with stormwater, like storm drains, steep slopes, and gardens. You may use the Stormwater Features Guide to help identify things to look for.

LESSON #2- Stormwater and Our Ecosystems (45 minutes)

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
• Asking Questions and Defining Problems • Developing and Using Models	• **ESS2.A: Earth Materials and Systems** • **ESS2.E: Biogeology** • **ESS3.B: Natural Hazards** • **ESS3.C: Human impacts on Earth Systems**	• Structure and Function • Cause and Effect • Systems and System Models

MATERIALS:

- Paper
- Pencil/Pen/Colored Pencil/etc.
- Plate
- Foil
- Cup of water
- Bowl with a small amount of water
- Small pantry items or natural items (sprinkles, spices, coffee grounds, dirt, gravel, etc.)
- Lesson 2: Stormwater and Ecosystems Jamboard slides
- Stormwater at Alki video: https://www.youtube.com/watch?v=GWaI1ZLnyZM
- Google Time Lapse: https://earthengine.google.com/timelapse/

INTRODUCTION

Focus question: How does stormwater impact our ecosystems?

Assess prior knowledge:

"What have we learned about stormwater so far?"

- As the words "stormwater", "pervious" and "impervious" come up, ask for a reminder of their meanings.

"For this lesson, we will be talking more specifically about how stormwater and these different surfaces impact ecosystems."

Check for understanding:

- Is ecosystem a word you are familiar with?
  What do you know about ecosystems?

Ecosystems can be defined as "all of the living and non-living things working together in an area." (Jamboard slide 1)

YOUR NEIGHBORHOOD ECOSYSTEM

"We are going to spend some time getting to know the ecosystem around our homes a little better by adding to our drawings from the last lesson"

- If some students do not have their drawing, they can create a new list/drawing for this part.

If you/students are able to, head outside with your drawings to help students see what is around as they map their neighborhood. There may need to be additional adult support/ supervision.

Give students about 5 minutes to go outside or look at window and draw/list the following **(show Jamboard slide 2)**:

- Where is there water or have you seen water on the ground before?
- What plants and animals do you see (living things)?
- What non-living things do you see (including things made by people)?

If students were able to do the scavenger hunt, ask what they found and add those things to their web.

Ecosystem Web

Pair share: Have students share some of the things they noticed with someone else.

On the back of their drawing or on another sheet of paper, have them list the things they saw. They can be grouped by category (living, non-living, water) or listed at random **(example on Jamboard slide 3).** Give a few minutes for writing.

"We now have a pretty good illustration of an ecosystem in our own neighborhoods. Remember that an **ecosystem is all of the things working together in an area.** How might some of these things connect to each other?"

- To start, focus on relationships within a category (ex. Living things), then find relationships between categories (ex. water and living things) Give an example.
- As students notice relationships, have them draw a line to connect them.
- Encourage students to be as specific as they can be – naming bodies of water and other specific things helps keep them focused on how this is relevant and connected to them.

If you have a large whiteboard, write students' responses for all to see

Introduce, if they haven't yet come up, salmon and orcas into the ecosystem diagram. "How can we connect orcas and salmon into our neighborhood ecosystems?" **(Example on Jamboard slide 4)**.

- The goal here is to remind students where stormwater ends up (rivers, ocean, etc.) help students understand how polluted stormwater in their neighborhood(s) eventually ends up in Puget Sound.
- An example connection is car > oil > puddle > stormdrain > stream > salmon > orca

"This ecosystem map shows how even at home/school, we are connected to many different things, some you may not have even realized before, like the orcas out in Puget Sound. Let's learn more about how stormwater from our neighborhoods can impact aquatic ecosystems."

MODELING STORMWATER

"We know that stormwater runoff carries pollution into nearby waterbodies like lakes and streams from our last lesson. Next, we are going to create a MODEL of that stormwater runoff."

Check for understanding:

- What's a model?
- Who has used a model before?
- Why might we want to use a model?
    - Remind them about the model we used in Lesson 1 (plate, foil and water)

Questions to consider:

- What are some of things that end up in the water from runoff from roads?
- What flowed into the water in the 'When it Rains it Pours' video?

Stormwater runoff demo

- The cup of water will represent STORMWATER
- The bowl of water will represent an aquatic ecosystem like a lake or stream
- Cover the plate with foil. This will represent an IMPERVIOUS surface like a road
- As students name pollutants, add different things to the foil to represent the types of pollutants on an impervious surface (ex. Oil, dog poop, soil from erosion, fertilizers or pesticides, trash, etc.).
- Use the stormwater cup to rain onto the foil surface and wash the pollutants into the bowl of water (your lake or stream)

Questions to consider:

- What do you notice?
- How might this stormwater affect this ecosystem?

"What does this look like in real life **(show Jamboard slide 5)**? This video shows a stormwater outflow pipe right off of Alki beach, however there are many pipes just like this one in other bodies of water. While you are watching, make some observations."

WATCH: Stormwater at Alki video - https://www.youtube.com/watch?v=GWaI1ZLnyZM

Questions to consider (pause the video periodically):

- What do you notice living here? Or think might be living here? (:00-:40)
- What changed? (:50-1:00, when dark water starts coming out)
- What might be happening right now? (mostly dark water--rainstorm)
- What might have made the water so dark?

Note: the brown cloud is stormwater, not wastewater from homes. The general darkness that occurs at the end is nighttime.

Questions to consider:

- Where might this water be coming from?
- What do you think could be in this stormwater?
- How might this stormwater affect the ecosystem?

STORMWATER AND PEOPLE

"So now that we have spent some time thinking about how the polluted stormwater affects wildlife, but what about us? Humans are a part of the ecosystem too. We interact with it every day in many ways, and the health of the ecosystem affects us."

Question to consider:

- What are some ways that you interact with water/aquatic ecosystems? (ex. Swimming, drinking, boating, fishing, etc.)

"Remember, we saw those signs of beaches being closed and 'no fishing' in lesson 1? Those are some of the problems that humans face when there is too much stormwater pollution in the water. Some people, like people who fish, really rely on the animals that live in our waters as a way of life!"

"One way that we can help keep our water clean and clear is with plants **(Jamboard slide 6).** Plant leaves help to slow down rainwater before it hits the ground and the roots help to hold onto the soil, making it harder to get washed away. That soil is also a pervious surface."

Check for understanding:

- What is a pervious surface?

"Plants also give us clean air and help to improve our moods. Many neighborhoods have parks and trees along the streets to do all of these things for the people that live there. But not every neighborhood has the same amount of green space/tree canopy as others. As places become more urban or like cities, we tend to lose many of those trees and pervious surfaces."

Environmental justice extension: Have students spend time exploring which areas/neighborhoods have more/less tree cover. Lower income neighborhoods and communities of color tend to have less tree canopy. Why might this be the case? How might this affect the different communities?

Changes over time

Show a Google time lapse of the school/where they live to give them a familiar place to see change over time. If there isn't much change in this area, find a spot on the map that clearly shows green areas being replaced with browns/greys. Let it run through the time lapse a few times to give time to understand what is happening here.

Things to note:

- The timeline at the bottom (1984-2018)
- You can type in a name/address of the school/location into the search bar but it will NOT zoom in directly on that address, just the general area. Spend a few minutes before class locating your area of focus on Google Maps.
- You will see as time progresses that some areas go from green to brown/grey as they become more urbanized (near cities, highways and/or already developed neighborhoods). If possible, direct attention to a place in the general area of the school that shows considerable greenspace loss.

CONCLUSION

"Expanding cities aren't a bad thing, we all need places to live. And we can create healthier communities for both people and animals by adding more tree cover and green spaces as our cities and neighborhoods grow. Next lesson we will learn about some of the ways people have come together and used engineering to help solve some of these stormwater issues in their communities."

LESSON #3- Engineering Solutions (45 minutes)

Science & Engineering Practices	Disciplinary Core Ideas	Cross-Cutting Concepts
• Asking questions and **defining problems** • Developing and **using models** • **Obtaining, evaluating**, and communicating information • Constructing explanations and **designing solutions**	• **ESS3.C: Human impacts on Earth Systems** • **ETS1.A: Defining and delimiting engineering problems** • **ETS1.B: Developing possible solutions** • **ETS1.C: Optimizing the Design Solution**	• **Cause and effect** • **Systems and system models**

MATERIALS:

- Paper
- Pencil/pen/colored pencil/etc.
- Lesson 3: Stormwater Engineering Jamboard slides
- Stormwater Solutions Cards

Focus Question: How can we engineer solutions to stormwater problems?

INTRODUCTION

"What have you learned so far?

- We've learned about what stormwater is, how it impacts ecosystems, how it impacts people, and how plants can help.

"Now we're going to talk about how people (even you!) can come up with solutions to some of the problems we've learned about."

Check for understanding (Jamboard slide 1):

- Is engineering a word you are familiar with?
- Have you engineered something before? What was it?

ENGINEERING DESIGN PROCESS

"Today, we're going to use an engineering design process to solve a stormwater problem in your community."

Engineering is when people use a process to design a solution to a problem (show Jamboard slide 2).

Introduction to the engineering design process **(show Jamboard slide 3).**

- "This isn't the only type of engineering design process, but it'll be the one we're using today. Our process uses three main components:
  - Define the Problem (What is the problem?)
  - Research and Develop Solutions (What information do we need to solve this? What are some ideas we could test that would solve this? What are the limits to our solutions?)
  - Optimize Solution (How can we learn from our other engineers and our own mistakes and improve our design?)

"Let's start with Define the Problem. What is a stormwater problem that you have seen in your neighborhood?" **(Show Jamboard slide 4)**

- Give examples: flooded streets, clogged stormdrains, pollution in the creek/lake, water is cloudy, etc.
- Give students time to identify at least one stormwater problem on the drawing they have created of their neighborhood.

If you have a large whiteboard, invite students to share what they have seen and write responses for all to see

"Now that we have identified the problem, let's start to think of how to solve it." **(Jamboard slide 5)**

Introduce **Criteria for Success** – how will we know what we've designed is successful? What evidence would you look for?

- Ex: area doesn't flood in a rainstorm, the grass isn't as muddy, the water isn't as dirty, etc.

Introduce **Constraints** – what are the limits on the solutions we can create?

- Ex: Time, Money, Resources, Expertise, Tools, Realistic, Space, etc.

The next step is to have students get a sense of what solutions others have used to solve a similar problem by researching solutions using the stormwater solution cards **(PDF; Jamboard slides 7 and 8).**

- When students identify a solution(s) they think might work for their stormwater problem, have them write them down.

Students can work on solving their own identified problem or work in pairs/small group to solve a problem of their choice.

"Now we can start thinking about what solutions we could come up with to solve the problems we've identified."

- Remember our constraints!
- Your solution should also be something that you would like to see in your community
- Walk through an example drawing with them **(draw your own, or use the example problem and solution on Jamboard slides 9 and 10)**
    - Demonstrate labeling things, including a key, using different colors (if possible)
- Give students time to add their solution to their drawing. They are welcome to use more than one of these solutions in their design. They are also encouraged to create their own solution if they feel something else would work better.

CONCLUSION

"The last part of the engineering design process is to "optimize" or improve on your solution. **(Jamboard slide 11)** Engineers always test their ideas to find out what's working and what's not working, and improve on their ideas. Solutions can always be improved. How could you imagine your solution working in your community? Would people like it?"

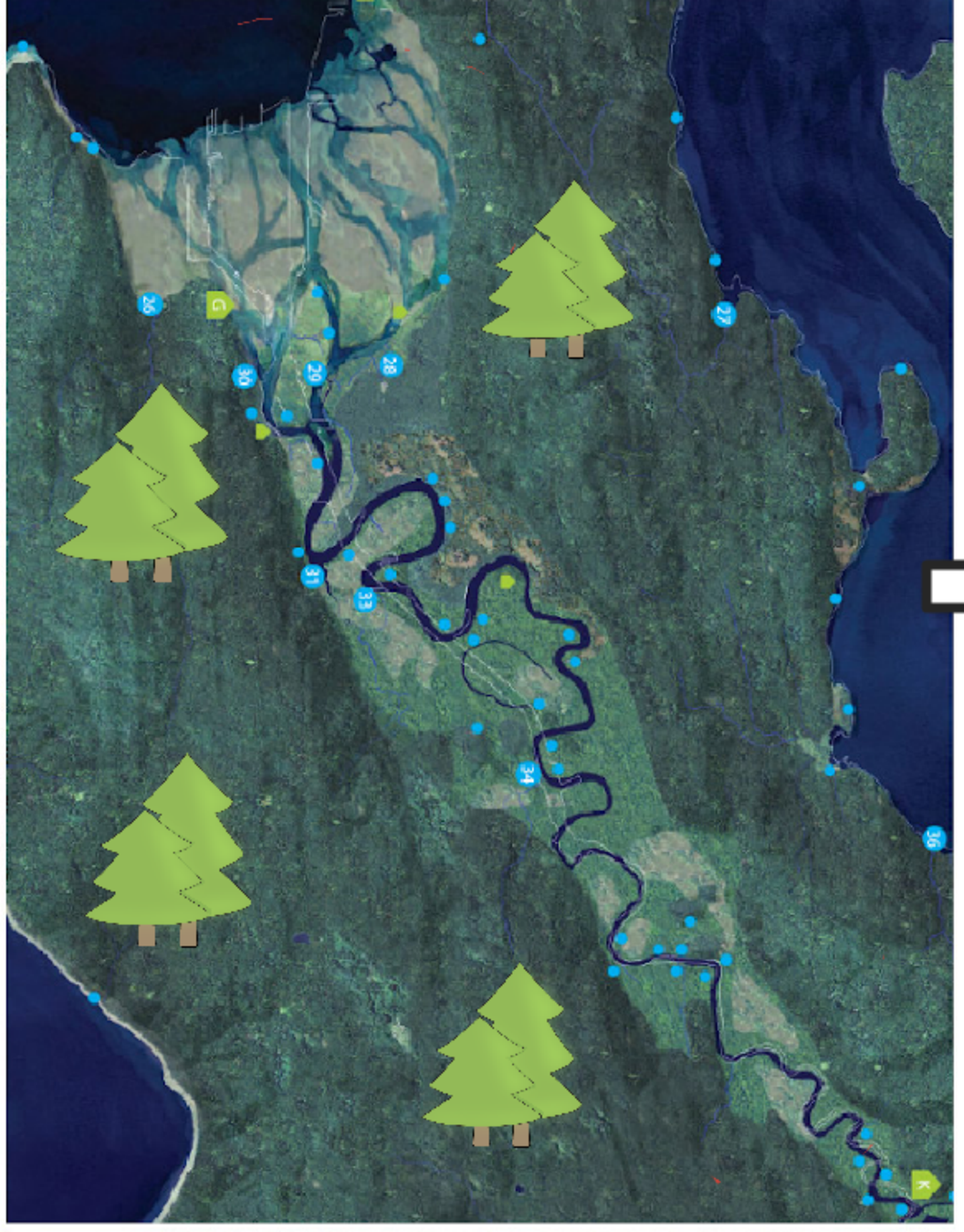
Group share:

- What sort of stormwater solutions would you like to see in your neighborhood/at your school?
- What can you do in your neighborhood to help solve stormwater problems?

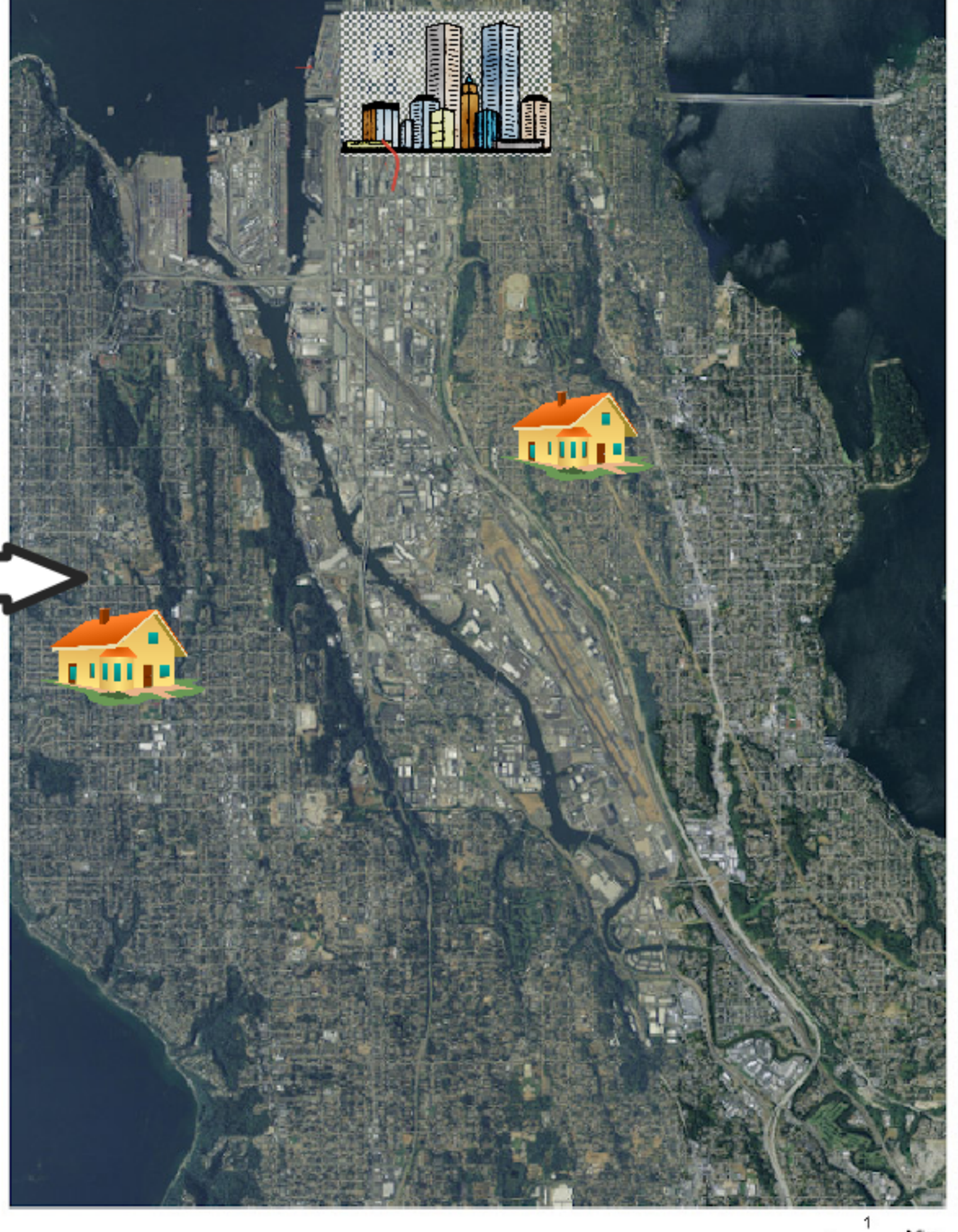
What happens where you live when it rains a lot?

https://vimeo.com/238134756

Lesson 1



Seattle **Mid-1800s**



Seattle **Today**

Stormwater

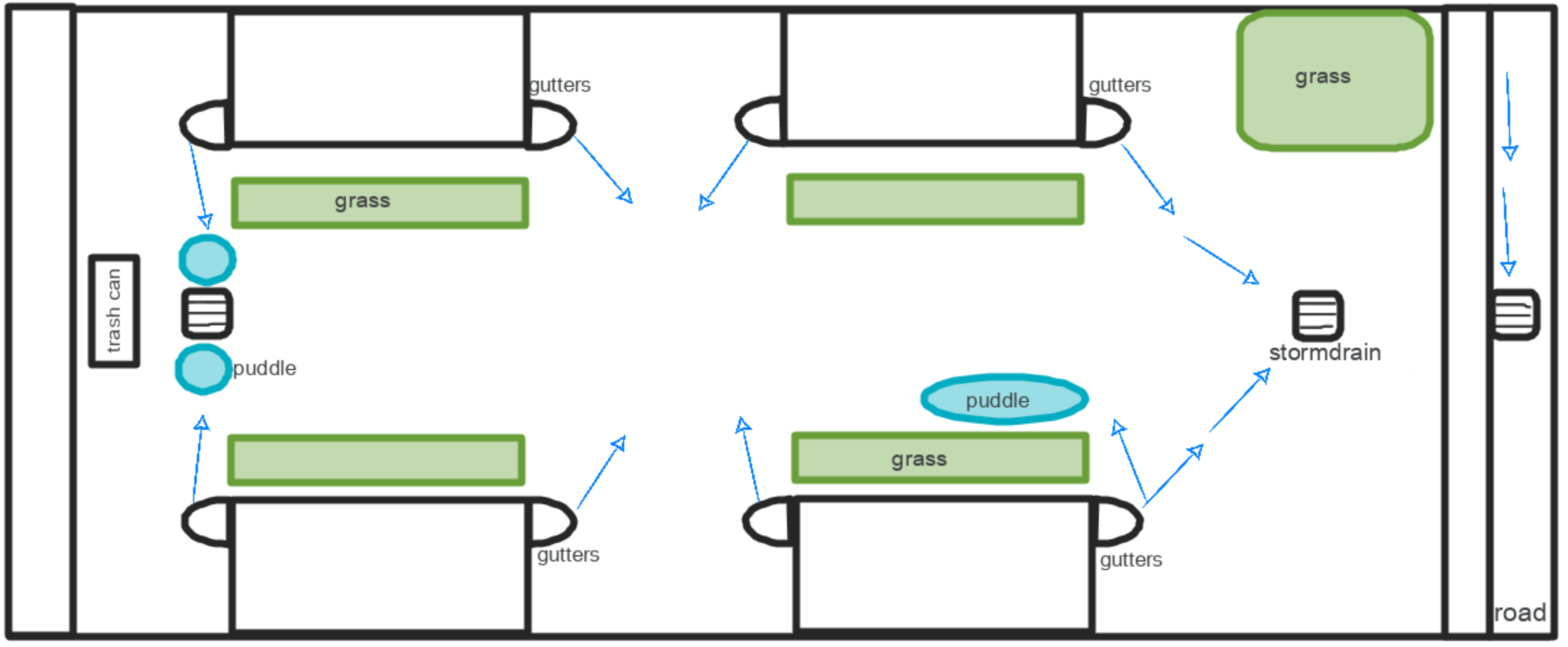
Impervious

Pervious

Draw a picture of what happens when it rains where you live!

Things to include:

- Drains, gutters, or other things that help move the water
- Arrows to show which direction the water flows
- Things that need the rain
- Impervious Surfaces: Streets, roads, sidewalks, etc.
- Pervious Surfaces: Gravel, soil, grass, etc.



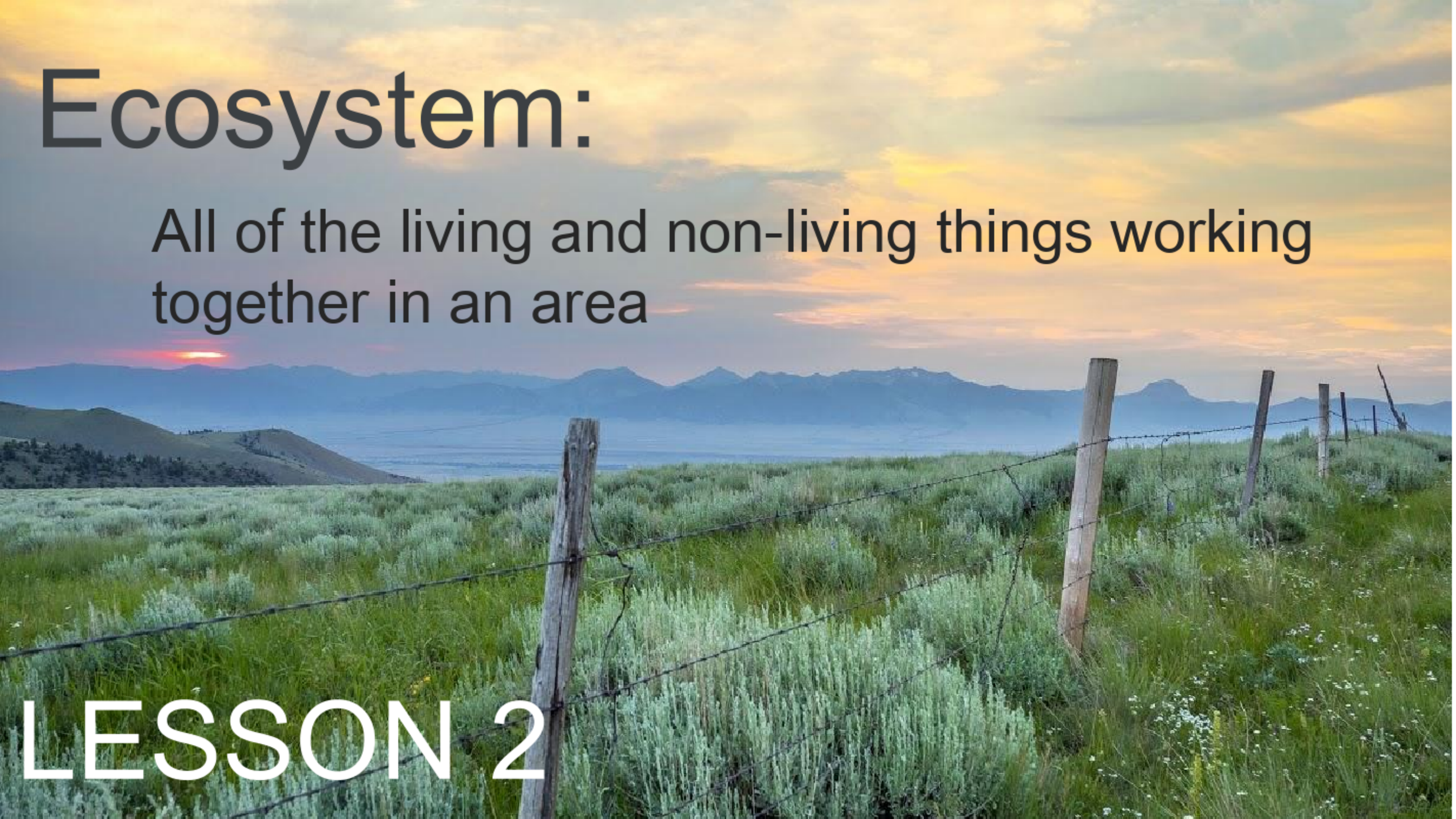
What do you like about the rain?

Problems with stormwater!

Have you seen signs like these?

Ecosystem:

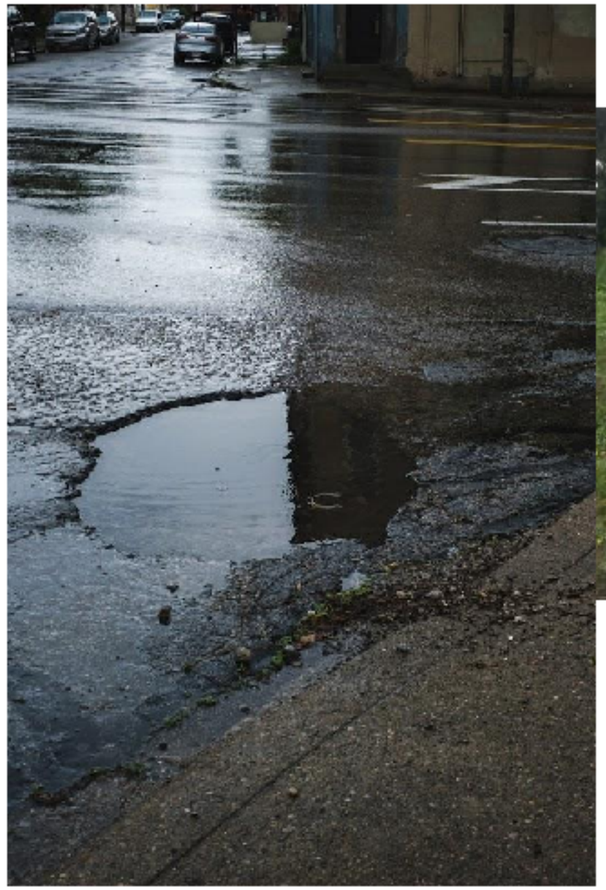
All of the living and non-living things working together in an area



LESSON 2

Take a look out a window...

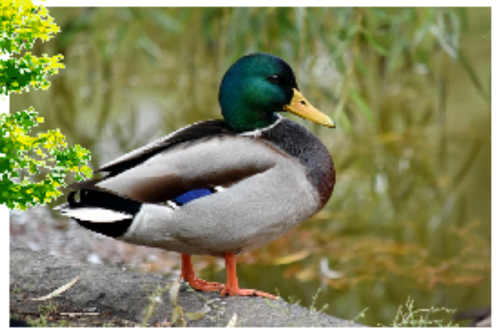
...add to your drawing

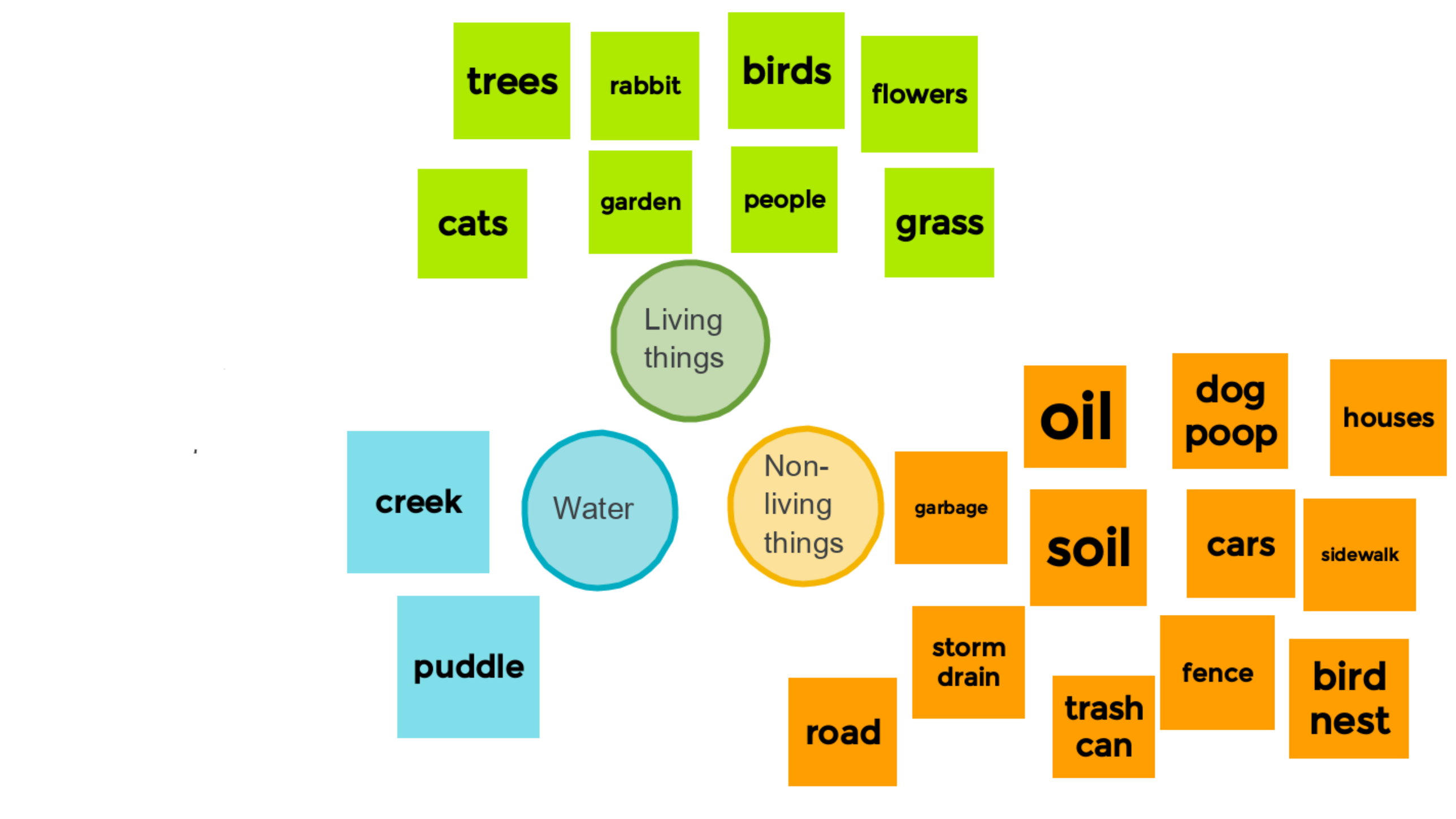


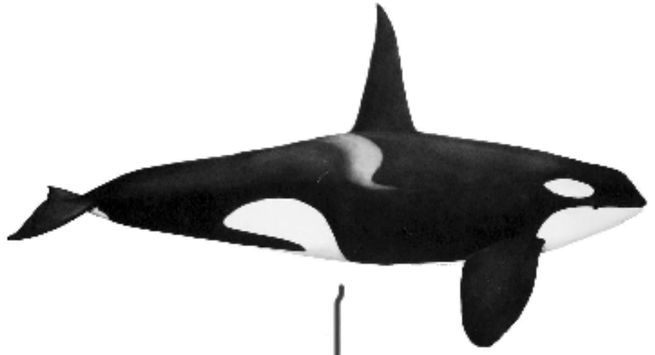
Water

Non-living things

Living things




trees
rabbit
birds
flowers
cats
garden
people
grass
Living things
creek
Water
Non-living things
garbage
oil
dog poop
houses
soil
cars
sidewalk
puddle
storm drain
fence
bird nest
road
trash can



trees

rabbit

birds

flowers

cats

garden

people

grass

Living things

creek

Water

puddle

Non-living things

garbage

oil

dog poop

houses

soil

cars

sidewalk

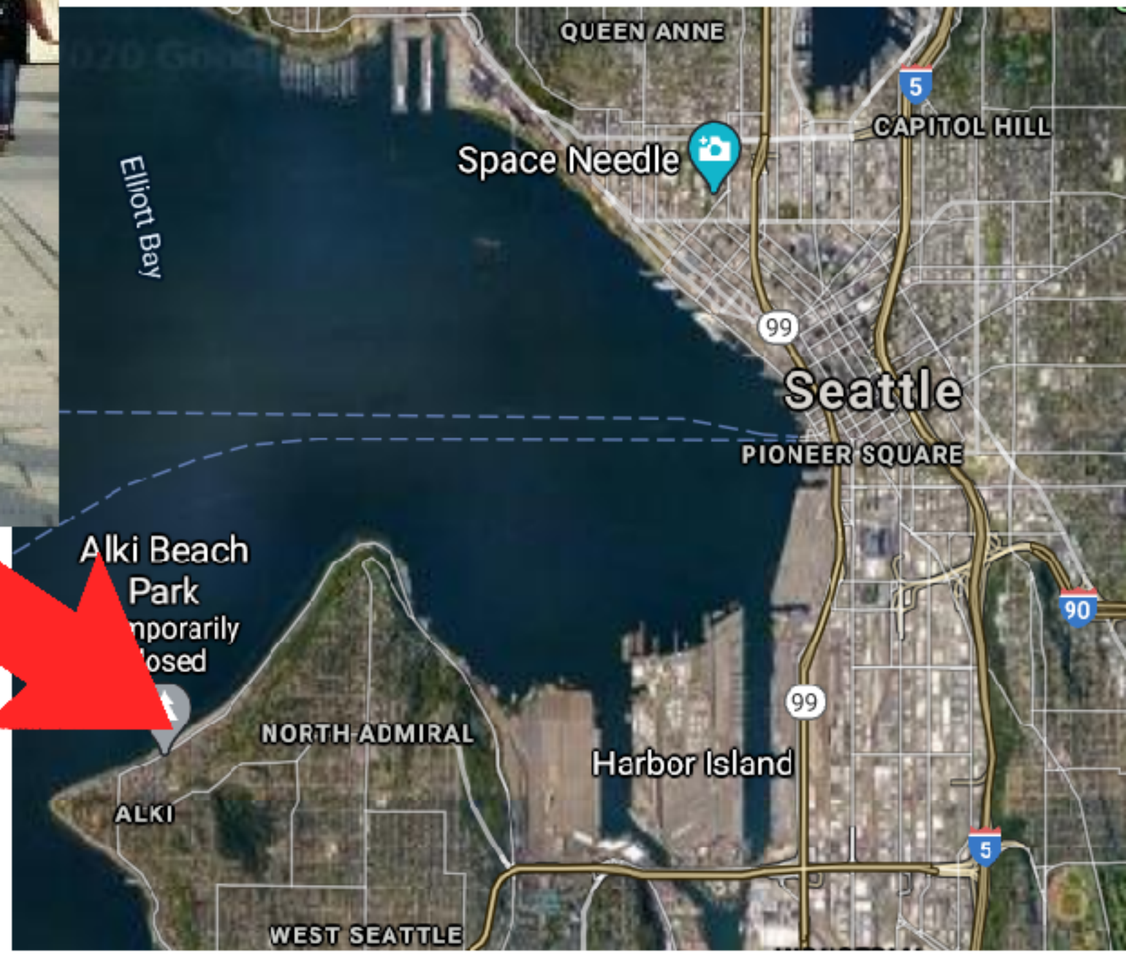
storm drain

road

trash can

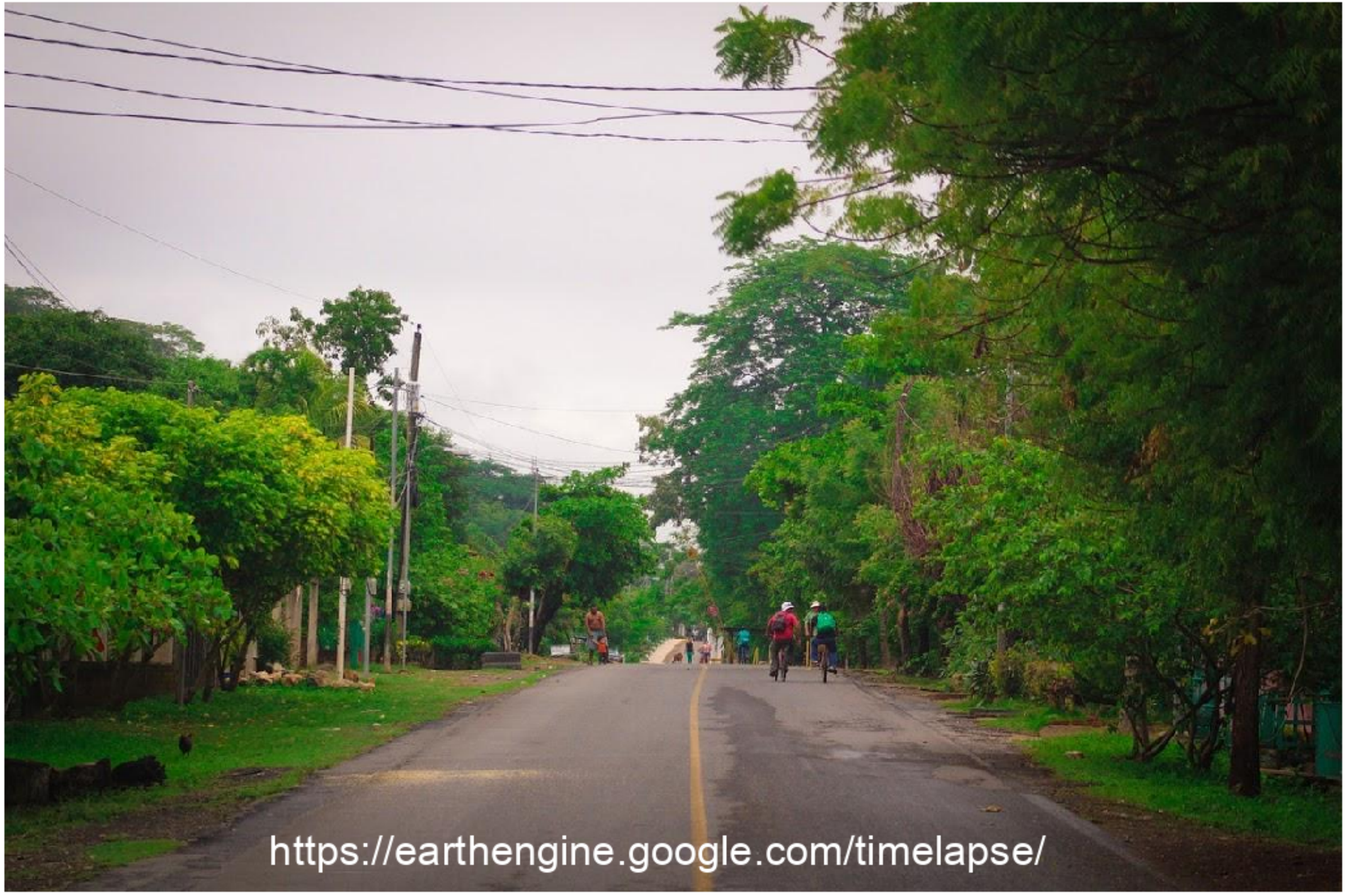
fence

bird nest

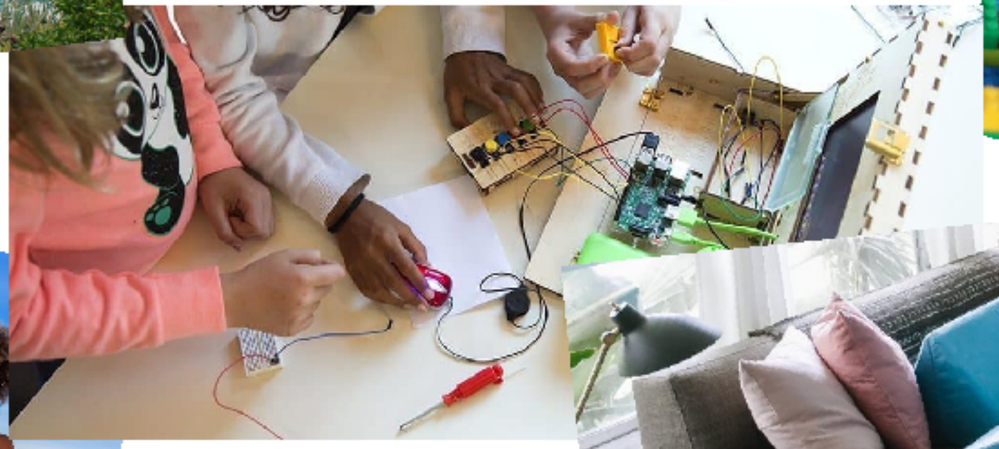


https://www.youtube.com/watch?v=GWaI1ZLnyZM

PLANTS HELP WITH STORMWATER PROBLE



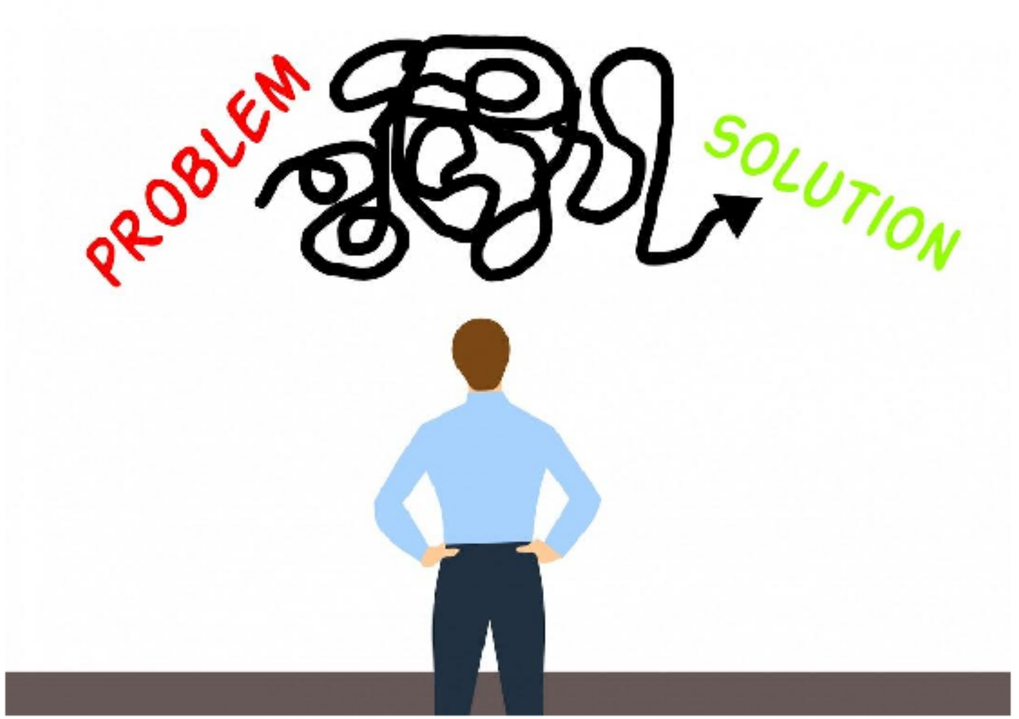
Lesson 3



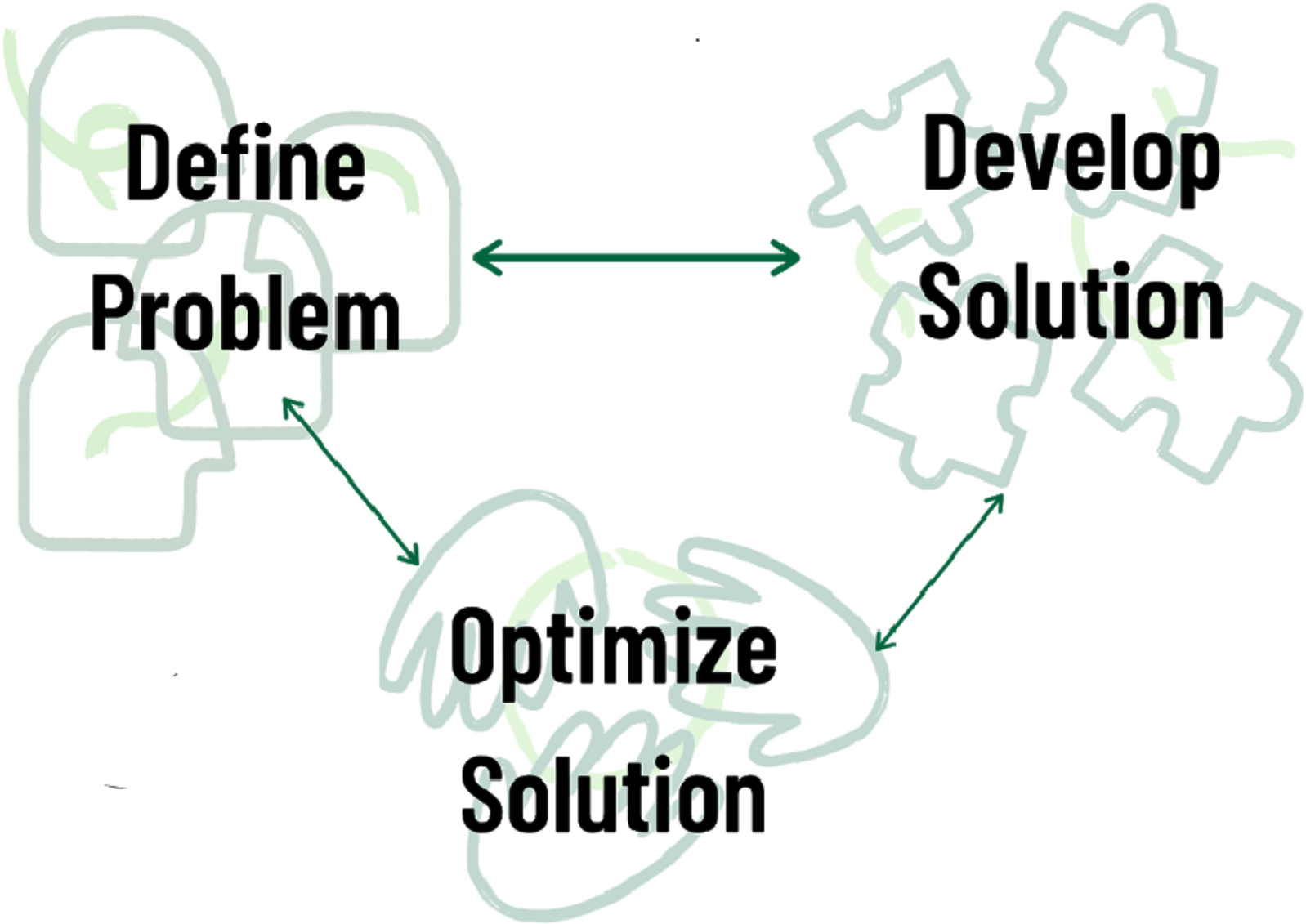
Engineering is all around us

Engineering:

When people use a process
to design a solution to a problem



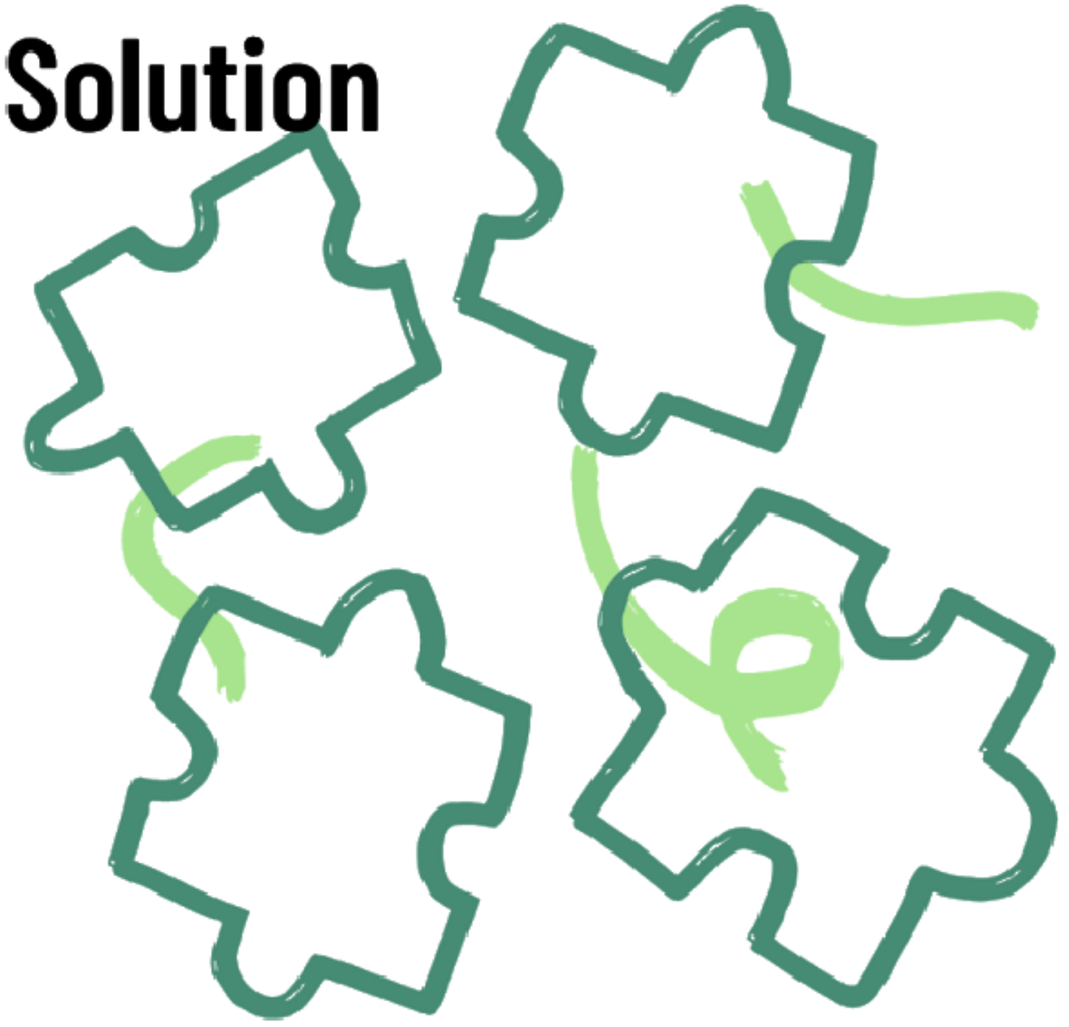
Engineering Design Process



Define the Problem

What are some stormwater problems that you have seen where you live?

Develop Solution



CRITERIA FOR SUCCESS:
how will we know what we created is working?

CONSTRAINTS:
What our our limitations?

Develop Solution

This includes research!

What have other people done to solve a similar problem?

STORMWATER PLANTER

Even small containers that have plants in them can be used to collect stormwater. The plants and soil help slow down and clean the water.

PERVIOUS GROUND

Any ground that lets water soak in. It could be woodchips, soil, gravel, or other surfaces. **Impervious** surfaces like concrete can be replaced with permeable surfaces to soak up stormwater.

RAINGARDEN

Raingardens are gardens that collect storm water. They have spongy soil and plants that like to live in very wet soil. They can't take as much water as a swale and are not as deep.

SWALE

Swales are engineered ditches meant to collect storm water and allow it to soak into the soil. BIOSWALES are swales that also use plants to help absorb water and pollution.

RAIN BARREL

Rain barrels collect water from roofs of buildings and hold it for watering plants or other uses. They are a cheap solution but don't hold a lot of water.

TREES

Trees are a simple, cheap, and effective solution when used correctly. They help soak up water and slow the water down as it falls from the sky.

DETENTION POND

Detention ponds are large ponds that collect stormwater. They are expensive to build but can hold more water than any other solution.

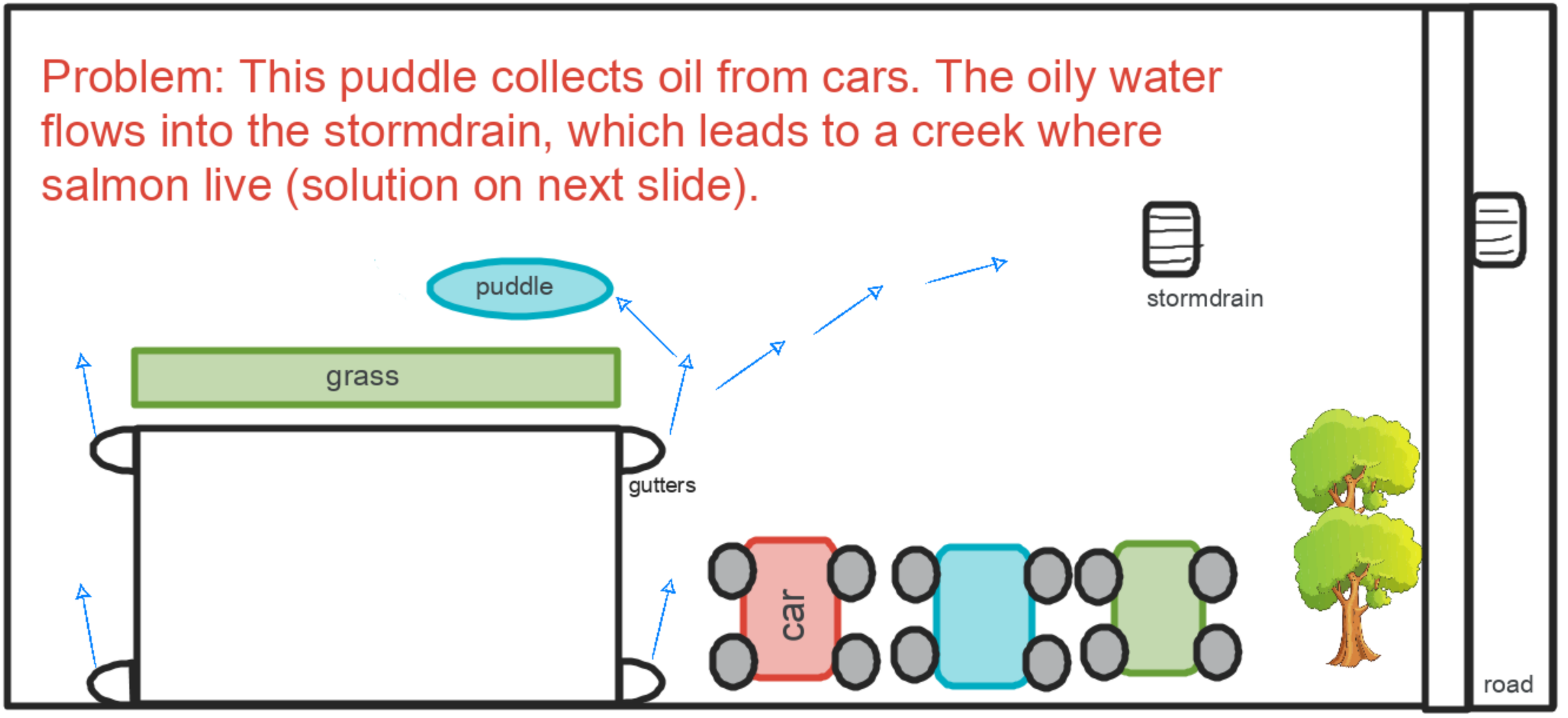
GREEN ROOF

Green roofs or living roofs are roofs that are covered with plants. Green roofs help soak up water and let extra water out much slower than normal roofs. They also keep buildings cooler on hot days!

Now draw a solution that YOU think could be used to help a stormwater problem!

Label your drawings!

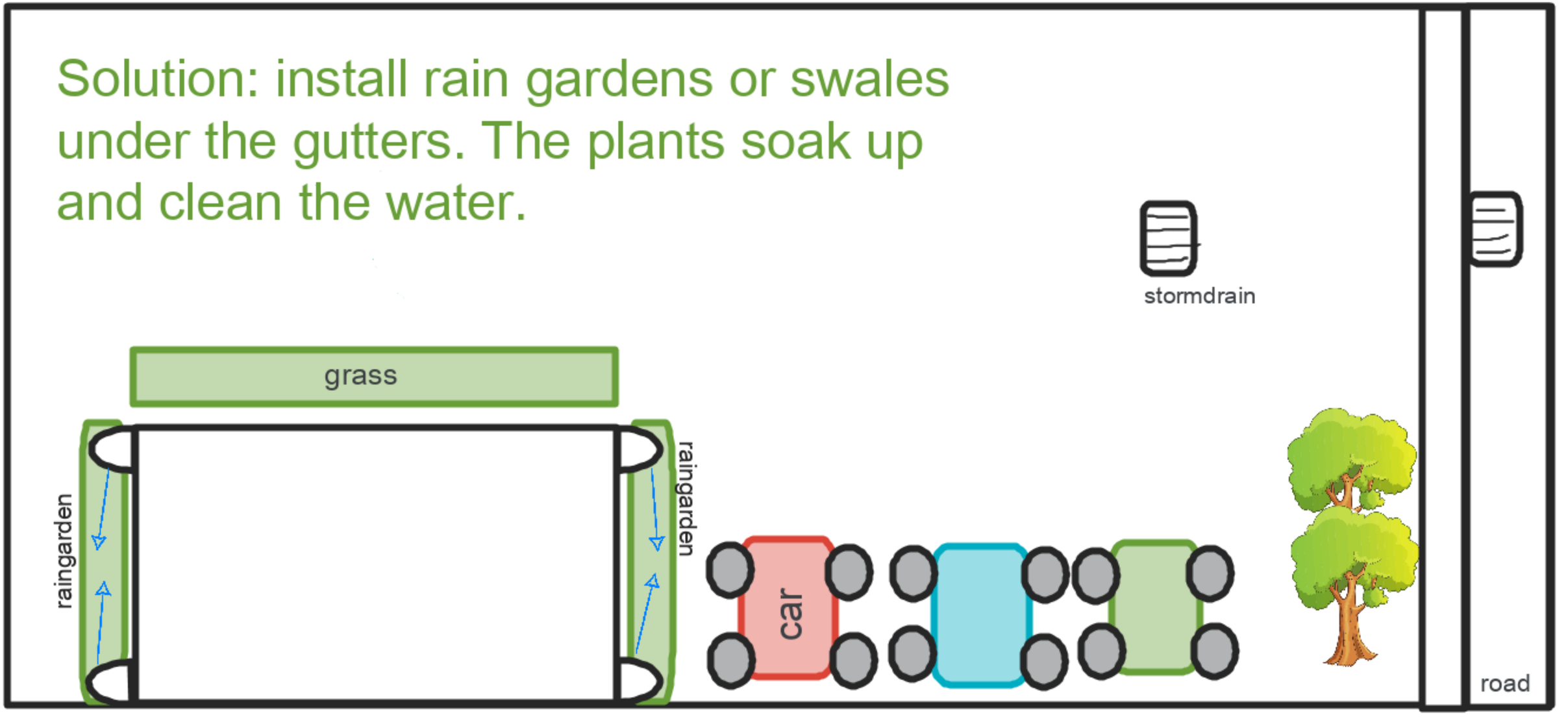
Problem: This puddle collects oil from cars. The oily water flows into the stormdrain, which leads to a creek where salmon live (solution on next slide).



Now draw a solution that YOU think could be used to help a stormwater problem!

Label your drawings!

Solution: install rain gardens or swales under the gutters. The plants soak up and clean the water.



Optimize Solution

What could make our solution even better?

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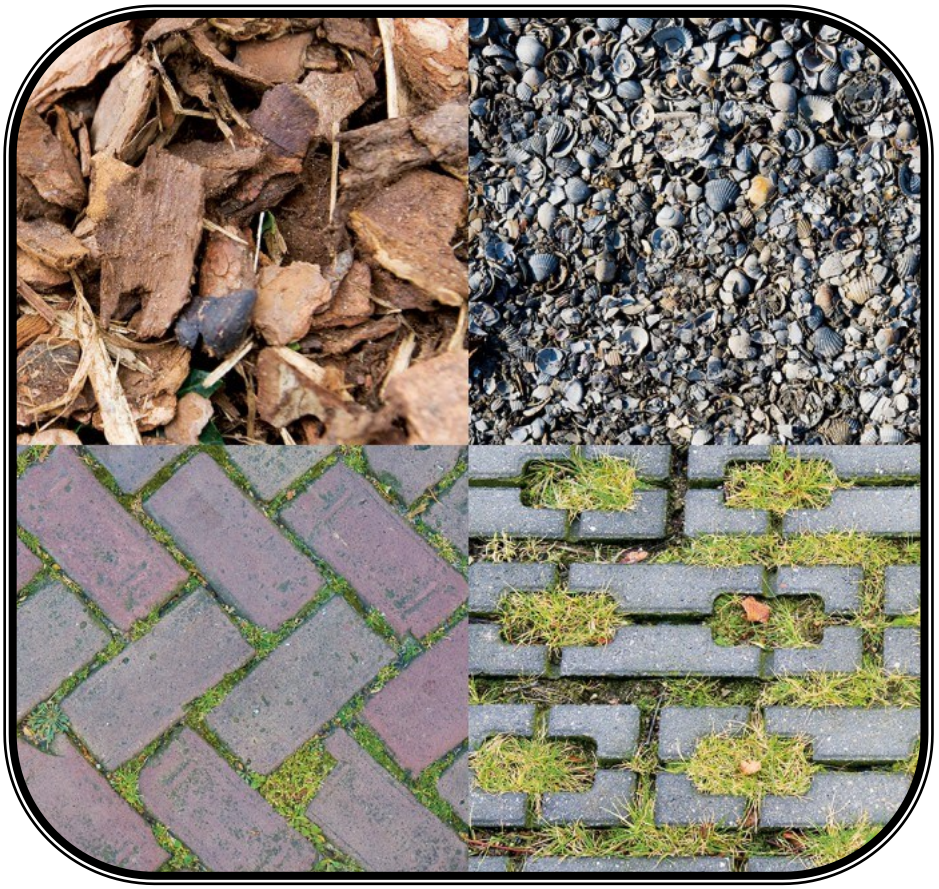

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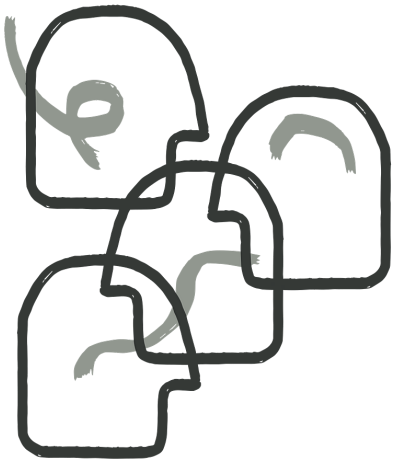
Interview Your Family

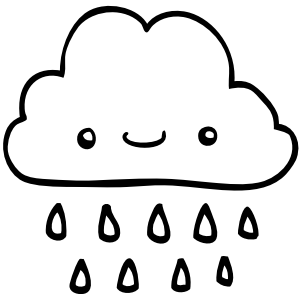
Be a reporter for this activity!
Ask your adult these questions:



When you were my age, did you like the rain?
What did you like to do when it rained?

Where did the rainwater go when it rained where you lived as a child? Do you know where all that water ended up?

Does our family or culture have any traditions or stories about rain or water?



Can you tell me a story about a time when it rained a lot?
(write down what you can of the story if you want!)
Do you know other stories about the rain?

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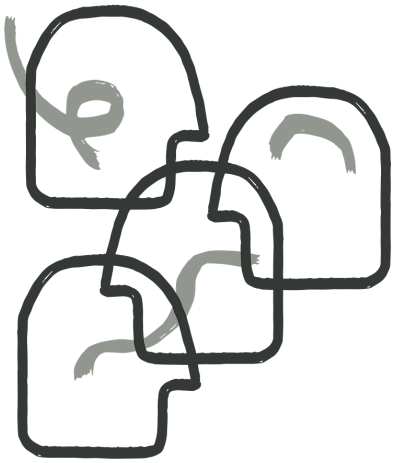
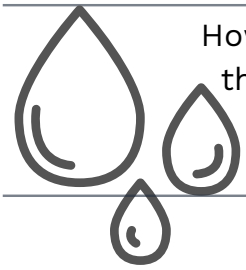
Interview Your Family

Now it's the adult's turn!
Ask your student these questions:

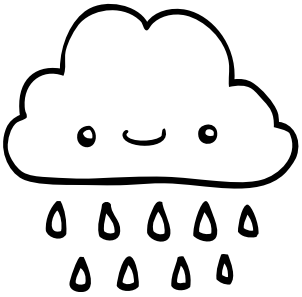


What do you like to do when it rains?

Does the rain ever cause any big puddles or other problems around your school?



How are my experiences with the rain the similar or different from yours?



What have you noticed around our neighborhood when it rains?

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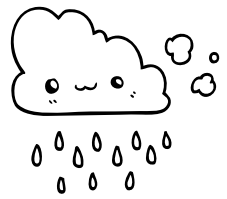
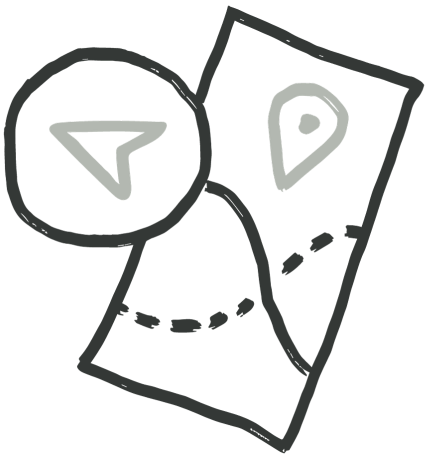
Stormwater Scavenger Hunt!



What's in YOUR neighborhood?

STORM DRAIN	STREAM/CREEK, POND OR LAKE	GARDEN OR RAIN GARDEN
DRAIN FROM A ROOF		STEEP SLOPE WITH PLANTS
STEEP SLOPE WITH PAVEMENT	SOMETHING THAT MIGHT GET CARRIED INTO A STORM DRAIN	SOMETHING THAT COLLECTS STORMWATER RUNOFF FROM A ROOF OR PAVEMENT

ISLANDWOOD™

Stormwater Scavenger Hunt How-To

Find an adult to walk around with you outside to search for things that interact with stormwater (the rain that's landed on the ground or roof).

With your adult, search near your home for the things on the other side of this page. Try looking on a map to know what body of water is nearest where you live.

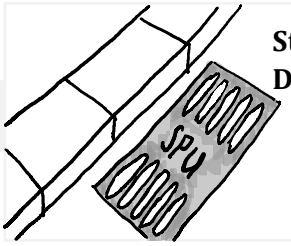
While you're on your walk, draw one of the interesting things you found in the box below. Be sure to label your drawing.

For more family activities, check out www.islandwood.org

Neighborhood Walking Field Trip

Questions you can ask anywhere:

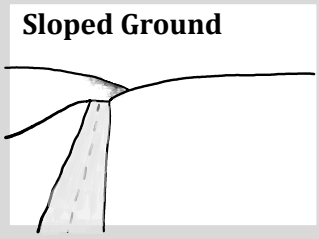
What do you notice about this structure/feature?
What happens to water on this surface or in this structure?
Where does the water go now? Where did it come from/how did it get here?
Does this surface/structure speed up or slow down stormwater?
Why do you think it was built here? Was it put here on purpose?



Storm Drain

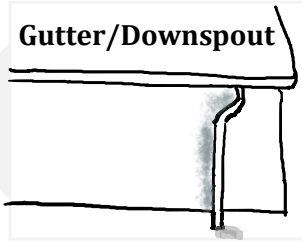
- Is there anything about the drain that isn't working? Anything on or in it?
- What might end up flowing into the drain other than rainwater?

Sloped Ground



- What kind of surface is on the slope? (grass, dirt, gravel, concrete?)
- How quickly does water soak in or run off?
- Does the water carry anything with it?

Gutter/Downspout

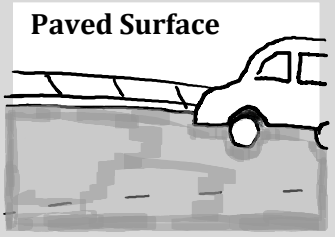


- If a downspout that is connected to the storm or sewer system was disconnected, where could the water end up?

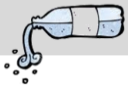
Find the end of the downspout and discover where it directs the water.

- Is there something to catch it? Does it empty into a yard or go into a pipe?

Paved Surface

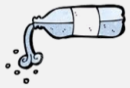


- Why is this part of the ground paved? Where would water go if it weren't paved??
- Would you say this surface is pervious or impervious?



Oil on Ground

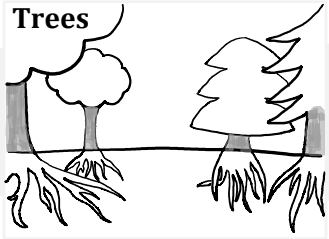
- If it rained right now, where do you think the oil would go?
- What kinds of animals (or people) might come in contact with this oil?
- How does the oil move when you pour water near it?



Lawn

- Where is the lawn located? Who uses it and what for?
- Do you like having lawns in your neighborhood? Why or why not?
- When water flows off it, could it carry anything with it? To where?

Trees



- How many trees are there? What is around the tree(s)?
- How might different sizes/types of trees deal with stormwater differently?
- Are there people or animals that would appreciate this tree here? Do you?
- Where else might you like to plant some trees in the area, if at all?

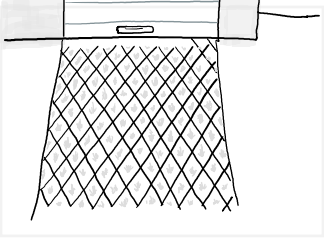
With an adult, ask a person in your neighborhood about what they know:

"Hello, we are learning about stormwater and problems it can cause in the neighborhood. Would you mind talking to us for a minute about what happens here?"

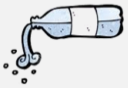
- Do you live near here? What happens to water here when it rains a lot?
- Have you heard of stormwater runoff? Where does the runoff go?
- Have you seen any problems caused by stormwater around here?

Person in the Neighborhood

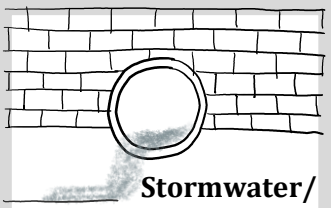
Permeable Pavers



- Why are these pavers here? What would happen if they weren't?
- Would you say this surface is pervious or impervious?

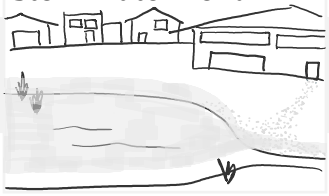


Stormwater/ Sewer Outfall



What do you observe about water coming out of the pipe? Can you see water going into it?

Stormwater Pond

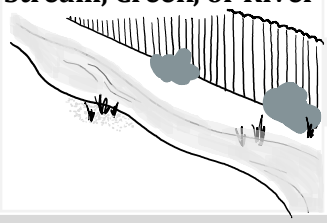


- Does this look like a natural pond or like it was built to hold stormwater?
- Would animals like to live in it? Why or why not?
- What happens to the water as the pond fills up?

Animals interacting with Water

- What kind of animals do you see?
- Do you think this animal needs this water here? What if it wasn't here?
- Observe the animal. What is it doing? Why do you think it chose to be there?

Stream, Creek, or River

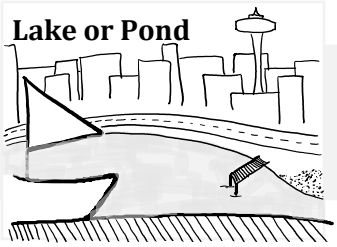


- Who or what would be affected here if the stream flooded? How fast is it moving?
- Do you see any evidence of humans having altered this stream?

Rain Garden

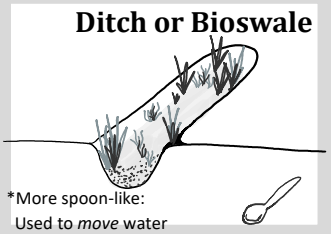
- Count how many kinds of plants you see. Do you recognize any of them?

Lake or Pond

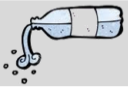


- What kinds of signs of animals do you see in/near the lake?
- Are there people in or near the lake? What are they doing? How does this lake benefit people? Have you been here before? Why did you come here?
- Is it clean or clear? Would you want to swim in it?

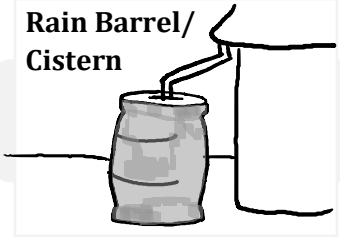
Ditch or Bioswale



- What happens when you pour water on different parts of the bioswale?
- Count how many kinds of plants you see. Do you recognize any of them?

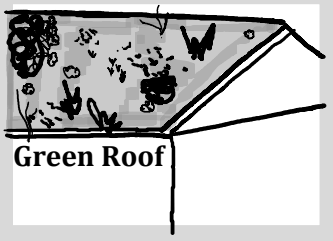


Rain Barrel/ Cistern



- What kind of building is it attached to? Who might have put it there?
- What could you do with the water in the barrel? What happens if it overflows?
- Is there a cover on the barrel? Why do you think it might be covered?

Green Roof



- What kind of building is it on?
- Who do you think takes care of the plants, if anyone? Do you like the way it looks?
- Do you see any animals (or signs of animals) or plants using the roof?