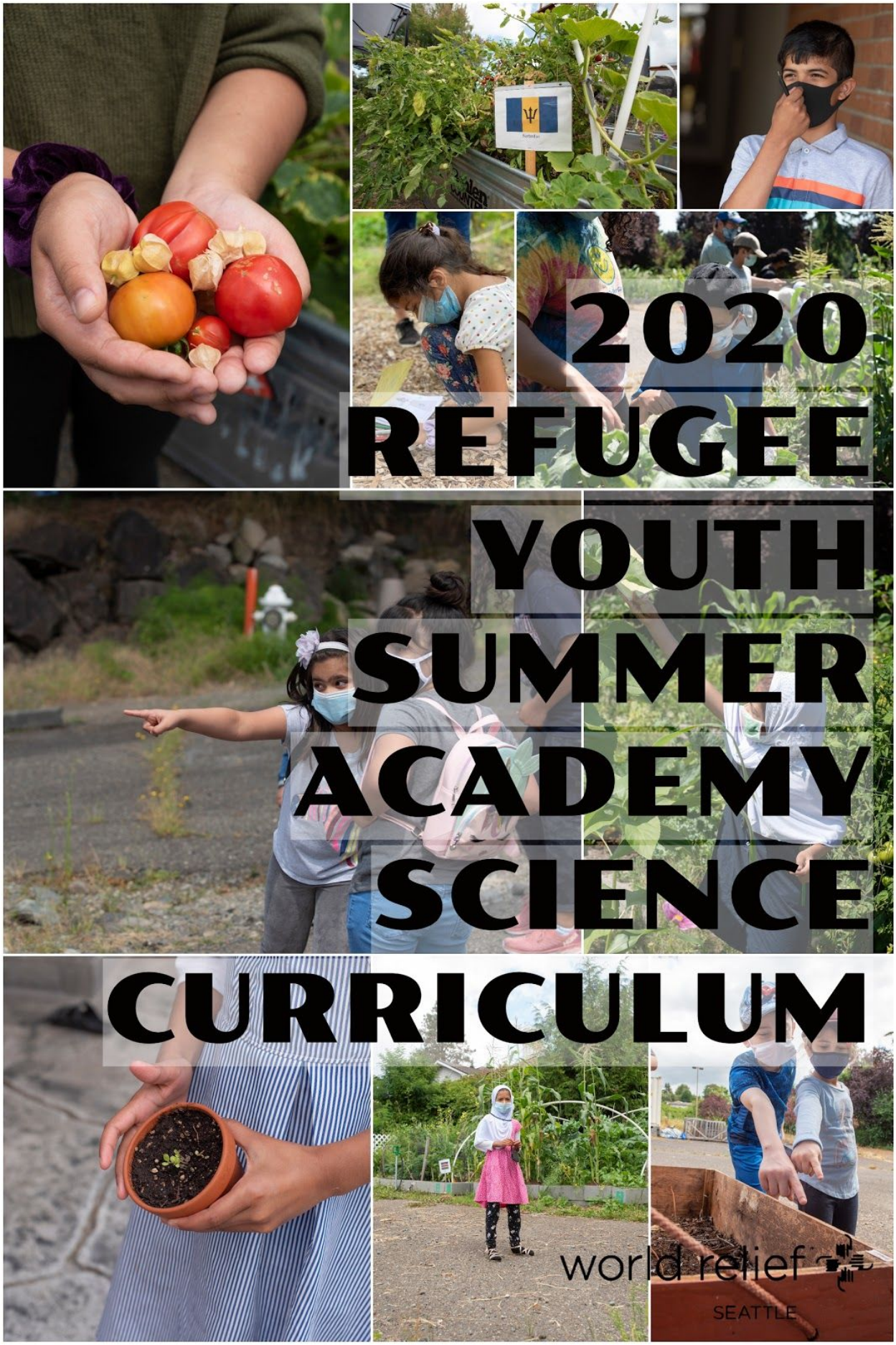

2020
REFUGEE
YOUTH
SUMMER
ACADEMY
SCIENCE
CURRICULUM
world relief
SEATTLE

PPP Website Layout Resources Plan , Lesson Plans & Powerpoints in Google Drive

Welcome to the World Relief Seattle 2020 Paradise Parking Plots Garden Summer Camp Lesson Plans!

Dear Educator,

This guide contains 18 lesson plans designed to engage students in an education and fun journey into the environment, systems thinking and plants. The activities to the lessons are adapted to COVID-19 guidelines, so the students can remain safe as they're learning. The students also have two home kits related to this curriculum.

A garden is a great resource to use when teaching students about biological/ cultural diversity and natural systems. The curriculum is a combination of embracing diversity and teaching how various species and systems coexist. The lesson plans also take into consideration various age groups and different levels of english proficiency. Be sure to establish clear rules and safety procedures with your students so everyone can have a positive learning experience and prevent the spread of COVID-19.

Preface

Importance of Refugee and Immigrant Student Focus

World Relief Seattle is a non-profit organization that works to resettle refugee and immigrant individuals and families in the Seattle area. Since 2018, World Relief Seattle has been offering a Refugee Youth Summer academy for refugee and immigrant students in consideration for their parents that need to work during the summer, as well as provide equity to the students especially if they recently arrived to the United States. Oftentimes, the parents of these students have to work in order to provide for their families. Thus, they cannot usually afford to put their children through a summer camp, and don't have the same english capability as parents that have been born in the United States. In addition, they also don't have the experience of the United States Education System that American born and raised parents have. This impacts children immensely, where some would have to apply for a job to support their family early on. Others would struggle to understand how to apply to colleges or gain funding for their education. For the students, this summer camp is adapted to their needs and introduces concepts to give refugee and immigrant students the tools to be successful when the topics would be introduced in the regular school year so that they can maintain the balance of school and work in the future if need be. As well develop a love for school, provide a driving change in their classrooms, and become a young leader, as they have been introduced to concepts prior and become confident in their abilities.

Teaching multiple grade levels

In this summer academy we taught grade levels K-8th in intervals K-1st, 2nd-4th, and 5th-8th. The lesson plans are set up to teach the concept at different levels of understanding respective to the grade intervals. These lessons are to introduce concepts to the students rather than have them learn in depth about the subject. The reasons being there is not enough time to go in depth about the topics mentioned within the time allotted for summer camp, and the lesson plan objective was to give the students a chance to catch up to their peers since these topics are usually taught in the school year. Throughout the summer academy, we modified the lessons based on what worked best and what actually happened. We learned that the students work best while playing games and following movements on Zoom.The online lesson plans are adjusted to one hour. The in-person lessons in the afternoons worked the best and the connections between the instructor and students flourished when they were able to see each other eye to eye. Added in this version are a few extra things that were not included in our lesson plans for better understanding. We hope you will enjoy and learn lots from the lesson plans below.

Adaptations to Summer Academy for COVID-19:

Due to the COVID-19 pandemic, the summer academy shifted from in-class meetings to a hybrid learning environment. This meant that morning lessons were taught virtually on Zoom. For the science teachers, this meant twice a week one hour each on Zoom remotely, on Tuesdays and Thursdays. With each morning lesson, there are presentations and videos. Both are linked in the materials section of the lesson plans. The afternoon lessons were taught in person for twenty-five minutes on the same Tuesdays and Thursdays at Paradise Parking Plots, a community garden created in partnership of World Relief Seattle with Hillside Church. For afternoon lessons, students were picked up from their home by a World Relief Seattle staff member. Social distancing and masking was practiced by all personnel on-site, only briefly taking a mask break far away from any individuals. The exception to social distancing being when students often came with their siblings that were registered at the academy. Students, volunteers, teachers and any others were to periodically sanitize their hands.

Student Take-home kits

Since we were not able to do classroom activities where we could see things grow together daily. The summer camp academy staff had put together “Student Take-home kits” per class. For our classes, we had put together a “Seed Planting” kit for each student to grow their own lettuce at home and tie concepts learned in classrooms to their plant. The instruction to create this kit will be included in this summer academy science curriculum and will be mentioned on every Tuesday morning lesson plan. The other kit that we put together was the “Paradise Parking Plots Garden Notebooks” which includes some maps that would be relevant to the students and a cover picture. Instructions to create this notebook, as well as printouts, will be in the science curriculum below.

Acknowledgements

Sustainability Ambassadors for training the interns, creating week 3 & week 4, and providing support. Sienna at King County and Charity at King County for the soil crafters lesson. Hannah Letinich for providing videos for the curriculum and for photos taken for camp. Whole Kids Foundation and American Heart Association for inspiration for this pdf and inspiration for sprouting seeds lesson plan. World Relief Seattle Staff: Brielle Cosgrove, for re-organizing summer camp under COVID-19 guidelines by Zoom lessons, afternoon system. Lucas for providing support, materials before lessons, and supervising. World Relief Seattle Equity and Sustainability Interns: Simran Purewal, for helping teach the summer camp curriculum for the 5-8th grade class and going above and beyond in making an enriching experience for the students. Anna Nguyen, for providing support and guidance during afternoon lessons. Fredy (former), for being resilient and still willing to help. World Relief Seattle Equity and Sustainability Interns: Risa Suho and Elisha Gill, for training the Equity and Sustainability Interns, planning meetings to modify curriculum, and for facilitating plans and videography. Elisha Gill for teaching the 2nd-4th grade class. Risa Suho for teaching the K-1st grade class. Thank you to the various volunteers throughout for helping make summer camp possible!

What does each lesson have?

Materials: A list of materials needed for the lesson.

Preparation: What needs to be set up before the lesson.

Presentations: These are on the “Resources and Lessons” section on the World Relief Seattle Website and lessons will link to that page when referencing the presentation. We recommend opening and teaching off of Google Slide, and giving students access to the presentations used.

Content Background: What the students should have prior knowledge and how they acquired that knowledge.

Learning target: The students should know how to do these objectives after the lesson has been taught.

Activity: The lesson activity signaled by steps. Some lesson plans will shift from one concept to another, bolded concepts in the activity signals lesson shifts.

Supplementary Activities/ Lesson extensions: activities to do if there is extra time left over or would be beneficial to add to the activity if taught in a longer time period.

Age Adjustments: Adjustments according to age. These are set up as K-1st, 2-4th, 5-8th groups. As the concepts get tougher, the age adjustments are most seen in the activity.

NGSS (Next Generation Science Standards (k-12 science content standards): Standards set the expectations for what students should know and be able to do. The NGSS were developed by states to improve science education for all students.

Camp Lesson Objective

Students will be able to understand science concepts such as mapping, things to grow & weather, natural rhythms in seasons & precipitation, and planning/engineering in a way that is relevant to the student's background in an engaging and hands-on way.

Weekly Learning Objectives

Week 1: Mapping

Students will improve my geographic literacy by being able to correlate locations and places where we acquire affordable and healthy food in real life with markers of locations on a map by identifying examples within Kent, Washington and internationally.

Week 2: Things to Grow and Weather

Students will understand the aspects of soil, compost, water cycle, and real-world implementation using the skills of scientific observation.

Week 3: Natural Rhythms

Students will learn about various natural cycles, such as the water cycle and weather, and understand how these cycles impact our environment and livelihoods by engineering models to mimic natural rhythms.

Week 4: Planning/Engineering

Students will create an understanding of the connection between the water cycle, watershed, natural landscapes, and water pollution by creating watershed models and analyzing the similarities.

Week 5: Looking forward/Reflection

Students will be able to recall the content learned throughout summer camp and demonstrate my knowledge in the activities to understand the real world application of the content.

Table of contents:

Student Take-Home Kits and Corresponding Lessons

Seed Planting

This lesson is based off of: School Gardens Lesson Plans by Whole Kids Foundation and American Heart Association "Sprouting Seeds" Lesson

Materials:

- Terracotta pots (4.3 in. L x 4.3 in. W x 3.7 in. H)
- Terracotta Saucers
- Black Gold Soil
- Sprout Seeds Weekly Growth Chart
- Lettuce seeds (5-6 seeds per seed planting kit)
- Seed sheet

Learning Target: Students will plant seeds that are quick starters in the terracotta pots and lettuce seeds awarded to us from the YGG. They will study the growth of their seed through the plant development process, harvesting what grows by the end of the camp.

Content Background: Throughout this summer academy, the students will be learning concepts that tie them back to the plant that they are growing. For example, students will be introduced to photosynthesis, water cycle, and what a plant needs to thrive. Looking at their plant, the students will be able to create a connection from the concepts they are learning to WHY they are learning the science concepts taught, and HOW they can use acquired knowledge to improve daily processes in their lives like taking care of plants.

Lesson Prep:

1. Make copies of the Sprouting Seeds Weekly Growth Chart for each student. Students can also make the chart in their garden journal
2. Teachers should gather materials to demonstrate the planting process.

Activity:

1. Demonstrate how to plant a seed. Pay attention to the planting depth, watering frequency, and how fast they grow.
2. After the seeds have been properly planted, have students water their seeds and put them in a sunny spot.

3. Then have students record the process of their plants growing and use them in their Sorting Seeds Weekly Growth Chart. This chart can be placed in their garden journal so that the students can refer back to it as time goes by.

Adjustments for Age:

5th – 8th

- Advanced- Full comprehend instructions and assist younger campers as Learning Assistants
- The older students could also lead the virtual lesson, where maybe some could write on the ppt if they can, or if some students know the steps to plant a seed and steps to a seed's growth we could let them talk through the process while we draw what they are saying.

2nd – 4th

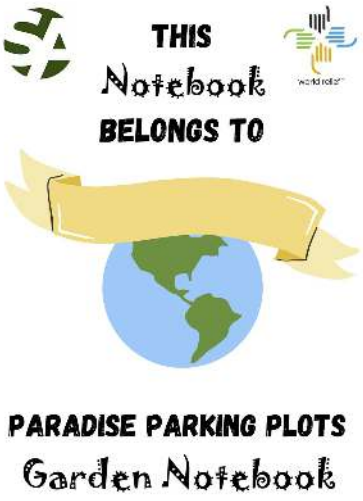
- Intermediate- May or may not understand what a seed needs to grow, could understand differences in seeds, still mostly demonstrative, interactive, visual explanations
- We could ask the students what they think is happening before we explain the visual aid, and see if they can piece together the story.

K – 1st

- Beginner- Little verbal instruction, mostly physical demonstration- you plant a seed, give it water, light, soil, food and you get a plant in a month

Supplementary Activities:

- Have students bring their plant or show a picture weekly if their plant is growing or not. Ask what worked and what didn't work.



Paradise Parking Plots Notebook

Materials:

- Print outs
- 9 pieces of 8.5” by 11.5” paper
- Stapler or a binding

Learning Target:
Create a notebook for students to place their garden investigations, use a notebook for in-class assignments, and include maps on the inside for map comprehension.

Content Background:
Students have gotten kits from their other teachers in the summer academy, but haven’t got a specific notebook for Paradise Parking Plots. It’s important to highlight different notebooks for different purposes in students in order for students to be organized and ready to learn.

Print Outs:
Notebook Cover

This is a cover notebook design. This will be helpful in identifying students' notebooks when there are designated in-person activities.

When printing out, enlarge the picture, rotate horizontally, and place it on one-half of the document.

Map of Kent Station, Mill Creek, and Paradise Parking Plots

This is a foldable page that will go on the inside of the notebook. You can refer to these during online lessons or in-person lessons when a map is unavailable to distribute.

The bottom picture (Paradise Parking Plots) will end up on the front inside.

Top picture (Mill Creek Middle School, Hillside Church, and Kent Station) will end up on the back inside.

Lesson Plans

Mapping

Week 1: Students will improve my geographic literacy by being able to correlate locations and places where we acquire affordable and healthy food in real life with markers of locations on a map by identifying examples within Kent, Washington and internationally.

Intro to Mapping

Applied NGSS Science Standards:

- Planning and carrying out mapping investigations to improve geographic literacy.
- Obtaining, evaluating, and communicating information on increasingly complicated maps.

Learning Target: Students will be able to identify on a map where they are now by pinpointing familiar spots.

Sub-Learning Target: This means what country they are from, what country and city they are living in now, and be able to point out where their school is on a map in relation to the community garden.

Content Background: These students have left what they considered home, and are now in a different place. This is a part of their story. Now that they are here, they can start to make this new place their home. This activity is meant to celebrate that students can come from all different places but they all now live here, and can make Kent their new home. It is all part of their individual story.

Materials:

- Google Maps
- Class roster (optional, but might help with activity)
- Zoom

PowerPoint:

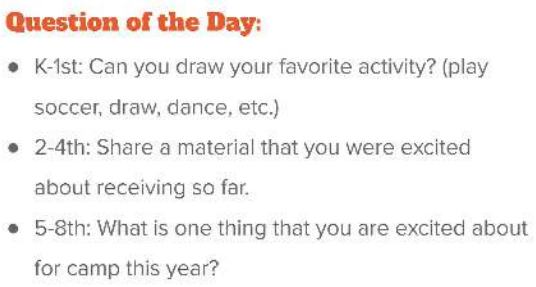
Week 1 Tuesday Morning PowerPoint

Lesson Prep:

- Visual aids and any picture stories should be prepared in chronological order.
- Put materials into Google Classroom
- The presentation is prepared by the interns beforehand, either the teacher or another helper is in charge of controlling the presentation as the Zoom host. Prepare teacher introduction videos to introduce all of the teachers, or create a personal introduction video showing some of the things important to you.

Activity:

1. Give some time in the beginning, then ask for some student volunteers to share what they answered for the "Question of the Day".



2. Introduce the notebook and the planting pots. For the notebook, have students write down their names and mention the maps. For the planting pots, go over the "Instructions" and the "Sprout Seeds Weekly Growth Chart". Answer any questions that the students may have. Tell them to plant the seeds with their parents present at a later time.

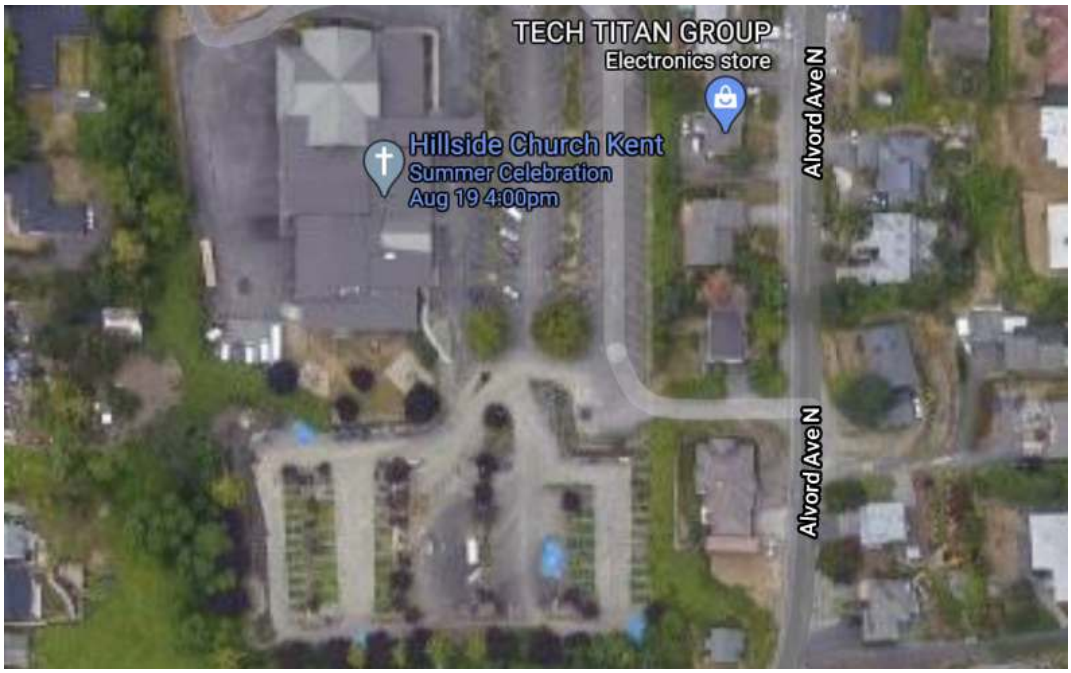
3. Present the Google Maps where students can either "raise their hands" in Zoom to speak or chat in the group chat to tell us which country they are from and go to that location.[1] Ask students what they remember from their home country landmarks, roads, weather, etc...).

4. Ask them if they can point out where they are now. In Google Maps, zoom in on Washington. See if they can name any states in the U.S [2]. Ask students if they can show you what state they are in.

[1] If some students do not know where their country is, see if other students can help them out. For example, if a student is from Afghanistan, see if there are other children from Afghanistan that can help point them in the right direction or look at a roster

[2] Students should "raise their hand" to speak or chat in the group chat.

5. Once they have identified Washington, ask students if they recognize this place. Confirm that they are living in Kent. See if students can identify where the map is.
6. Have students point out where the garden is, where the school is, and see if they can identify where their house or apartment is if they live close by. With Google Maps, you can show students that you can see pictures of buildings if they zoom in close enough. Have students try to identify other buildings, such as stores, parks, etc. (students should "raise their hands". At this point, try to avoid using the group chat too much).
7. Ask students to compare and contrast landmarks, roads, weather, etc... of their home country and Washington.
8. Explain to students that they all come from different places, but they all now live in Kent and it is their home. (presenting teacher can use themselves as an example i.e "I live in Kent, but my family is from...")



9. Introduce Paradise Parking Plots through Google Maps.
    a. If some students have been there before, ask what they remember.
10. Play the introduction video of the teacher or of the collective garden teachers.
11. Garden explanation
    a. Play the pre-recorded video of a mini garden tour. The video we created is in our PowerPoint.
        i. After each video, ask the students what they noticed/what they found interesting.
    b. On the slide with pictures, briefly explain what they are speaking.[3]

Supplementary Questions:

[3] When playing videos on Zoom, make sure to share the screen you want to show, and have the audio box checked.

1. What was your favorite/interesting thing from this presentation?
2. What is something that you are excited to see at the garden?
3. What did you notice/see in the garden pictures? Why would that be there?

Adjustments for Age:

5th – 8th

- During the world map activity, ask the students to each say one fun fact about their country or a memory they have about their country.
- When all mapping activities are finished, these students can use the(virtual) map to try and find where the garden is located. On Google Classrooms post the presentations with all the maps before the lesson, so during the lesson, the students may be able to access the maps.

2nd – 4th

- These students might need some help with identifying their country of origin, so have the class roster on hand if needed. You can also ask these students to share a fun memory or fact about their country.
- When all mapping activities are finished, these students can use the flashcards to practice identifying countries. The flashcards we recommend are from Quizlet so these students still have flashcards but it's online, the link is featured in the PowerPoint, lesson, and resources at the bottom of this curriculum guide.

K – 1st

- These students will probably need more help with identifying their country of origin. Using the class roster to help them along would be useful here.
- Younger students don't remember as much about landmarks, but sometimes they can compare weather, and instead of asking about the area, you can ask about what they did? If they swim did they swim in a pool or the ocean? If they gardened what kinds of vegetables? It paints a picture of what their life was like before moving to Washington.

Supplementary Activities:

1. Introduce my.water.world and use that for the "where are we now" part of the activity.
2. The older students can go out and try to find the garden for themselves based on their maps. The older students can play the Google Maps game. Where each one of them can go into google maps, but the "yellow person" somewhere close to the garden and see if they can try to find their way to the garden with google street view.
3. Go through Quizlet 1 & 2 with the students

Garden Mapping

Applied NGSS Science Standards:

Planning and Carrying out Investigations on the Paradise Parking Plots community garden.

Obtaining, Evaluating and Communicating on the various features of the Paradise Parking Plot garden.

Learning Target: To be able to properly orient and locate objects within an environment using a map.

Sub-Learning Target: This means adopting a role, marking items on maps, making connections based on context clues, and exploration.

Content Background

The older students will be applying the map skills learned in the morning to locate important items and features around the garden. Although not much explanation of the items will be given on this day, the concepts will come back in later weeks and lessons. This lesson will familiarize students with the map scavenger hunt exercise so that they can assist the younger kids with the simpler version on Thursday.

Materials

- Scavenger hunt list -Print Out[4]
- Enough laminated maps for each student (Paradise Parking Plots)
- Visa-V markers if using laminated map or markers
- Clipboards if using paper maps
- Paradise Parking Plots Notebooks


Paradise Parking Plots Scavenger Hunt

Rain Garden
(Note any structures like the bridge, black hoses, etc.)

4 Cisterns
(Where is the 4th one?, Why is the 4th one far away?)

Community garden
(find at least 1 above ground and 1 in the ground)

1 of the smaller rain gardens
(Note where they are located)

Worm Compost Bins
(Have a look inside!)

Hugelkultur bins
(See any plants you recognize?)

Print Out:

Lesson Prep:

- Create, print, and laminate Scavenger hunt lists to distribute to each student or family of students.
- Bring the materials listed above to the garden.
- Disinfect maps and materials to be distributed.

Activity:

1. Introduce the interns/ volunteers that are on-site.
2. Distribute 1 laminated map of the garden, 1 Visa-V marker (let them choose the Visa-V marker), and 1 laminated scavenger hunt list to each student or family of students.
3. Assign roles to individual students in one group.

[4] To create the same Scavenger Hunt List, copy and paste the “Paradise Parking Plots Scavenger Hunt” in the materials section. Alternatively, look at the “Resources” section at the bottom of this PDF for the google document of the list

   a. Older students can read the list.
   b. Younger kids mark off things on the list and hold the garden map. [5]
4. Students must find all items on the scavenger hunt list and mark on the map
   a. Teachers should lead them to the sites mentioned on the scavenger hunt
      i. For every 2-3 students, there should be 1 teacher.
   b. Explain the sites as your group proceeds through the garden.

Big rain garden
- have them guess what a rain garden might be.
- Have them describe what they see (rocks, flowers, bees, etc)

4 cisterns
- have them pound or slap each of the 3 bottom cisterns, mention the top cistern.

Community garden
- Have them read the laminated flags and point out the different colors in the garden plots.

1 smaller rain garden
- Mention the soil in the garden plot vs the smaller rain garden

Worm composting
- Explore the worm bin.

Hugelkultur bins
- Look at the plants and mention colors.

Supplementary Activities at Base:

1. When finished with the garden tour ask students what they learned, what interested them the most
2. Ask students to draw their favorite landmark of the garden in their Paradise Parking Plots notebook

[5] Note: If a student is overshadowing, redelegate the roles.*
Let the students guess where the things on the list might be on the map and in real life. If they are wrong give them hints about where the things on the list might be.

Where Does Food Come From?

Applied NGSS Science Standards:

Planning and Carrying out Investigations about where food could be found locally and outside the U.S.

Asking Questions and Defining Problems within Kent regarding accessibility to food that's healthy, affordable and culturally diverse.

Learning Target: Students will be able to identify different places to buy food in the United States. They can see that it is possible to grow your own food so you can make your own recipes. Students will share a recipe from their own family to share with the class.

Sub-Learning Target: Students will be analyzing various images of grocery stores, market places, and farms in varying countries and discussing cultural recipes to make the connection of the importance of culturally appropriate to the creation of cultural foods.

Content Background: Grocery stores may look different in the United States as compared to the students' origin countries. They might sell different products, but you don't always have to buy food from the store. It's possible to grow your own food as well. By growing food in places that have little green spaces, you are reclaiming the land and making it a part of your home.

Materials:

- Virtual flashcards with different food environments from DIFFERENT countries (А Т Б-Маркет - grocery store chain in Ukraine, open-air markets in Afghanistan, etc.)
- Virtual flashcards with food environments from U.S., specific to WA (Fred Meyer, WinCo, Costco, farmer's markets, farms, garden)
- Piece of paper
- Colored pencils
- Virtual Whiteboard
- Google maps

PowerPoint:

Week 2 Tuesday Morning PowerPoint

Lesson Prep:

- Before class, research about common plants outside the U.S., food environments, and common spices.
- Try to find pictures of at least one or two different places for each country represented in the students.
- Find pictures of different food environments in the U.S., make flashcards out of all the different environments, and separate them into their respective piles.

Activity:

1. Ask what they remember about grocery stores in their home countries. Where did their families usually buy food? How often would they go to get groceries? Try to ask students to share from different countries. Then, go through the flashcards and see what students know. Explain the ones that are unfamiliar.

2. Show the students the picture stories depicting various grocery stores, food markets and farming practices from different countries. See if the students recognize any of the fruits and vegetables in the images. Use only 4-5 picture stories, the lesson can get long if there are too many picture stories and get exhausting for students.
3. Ask students what grocery stores their parents go to in the United States. Start creating a list of different grocery stores that they know in the U.S. Do they go to different grocery stores? Do they grow their own food?
4. Teachers go through Google Maps with the students from the created list of different grocery stores in the U.S. and look at where the different stores are.

   a. Ask students which grocery stores they want to look at first, second, so on.

5. Go through the picture stories. Have students analyze what is going on in the pictures. What might you see, smell, feel? Following the picture stories have kids contribute to the farmer's market/farming/grocery store compare and contrast chart.
6. Have the younger students pick a piece of paper and have them draw their favorite dish, if they are able and willing, then they can draw on the Zoom whiteboard. They can draw their favorite food and share where they eat it, how many people usually eat with them, etc.

7. Discuss the ingredients that are in their favorite dishes. Ask where they can find the ingredients (grocery stores, farmers market, etc..)

For example:

If the dish was pancakes, the ingredients would be: eggs, chocolate, blueberries, strawberries, and syrup.

8. Discuss which ingredients you can get here versus in their home country. Create a list of these.
9. Then ask students what are different foods that are here but not back in their home country? What can they find back in their country but not here? What should we do if we can't find food back home? End with the vegetable song.

Adjustments for Age:

5th – 8th

- Focus more on mapping. These kids should get more familiar with mapping for future lessons.
- Urge students to contribute to the compare and contrast chart

2nd – 4th

- Focus more on ingredients. They can get help from their family members and older siblings if they are stuck.
- They know quite a bit of vegetables. Have them list more than compare and contrast.

K – 1st

- These students might need help remembering ingredients. They can focus more on drawing their favorite meal.
- Include more actions, dances etc
- Have a few breaks to from the lesson to move
- Focus on simple foods everyone knows and have the class build an ingredients list for that one food item.

Supplementary Activities:

- Play hangman (or an alternative to that game) with focus on ingredients or plants.

Garden Plot Investigation

Applied NGSS Science Standards:

Obtaining information about the garden plots, Evaluating the plants and structure of the plot and Communicating the significance of the plot.

Planning and Carrying out investigation on various garden plots representative of different countries.

Learning Target: Students will learn about different countries and what types of food people like to grow in correlation to their culture.

Sub-Learning Target: Students will search PPP community gardens and identify plots from different countries to understand the variation between the types of produce each plot grows in correlation to the country the plot represents.

Content Background: The older students have already done this activity on Tuesday and will be directing the younger students to find the different flags in the garden. If not, the interns can help lead some of the activities. The idea is for the students to see that people from different countries are reclaiming the land here and making it a part of their home.

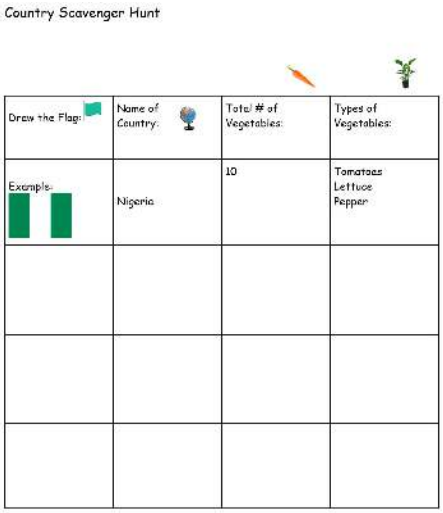
Materials:

- Flag icon pages
- Visa-V Markers

Print out[6]:

Lesson Prep:

- Create, print, and laminate enough flag icon pages for each student.
- Bring materials to the activity.
- Disinfect any materials being distributed.


Country Scavenger Hunt

Draw the Flag:	Name of Country:	Total # of Vegetables:	Types of Vegetables:
Example:	Nigeria	10	Tomatoes Lettuce Pepper

Activity:

1. Tell all students what they will be doing today - investigating garden plots.
2. Distribute laminated flag icon pages where they identify a country's flag, name, how many plants are in the plots, and the types of plants. Make notes using the visa-v markers of what is growing in that plot. When they are done, meet back at the

[6] **(more tables on actual document if needed)**

shed. On average a group of students finished one plot in 5-7 minutes

3. Let the older students lead the activity. Garden teachers can also help where needed. Assign roles to each student.
4. Have students look around each garden plot trying to identify vegetables they are familiar with. If they spot one they are not familiar with, lead them to the conclusion that this is a vegetable from a different flag. At the end draw the conclusion that this garden has many different vegetables from many different countries.
5. If the group of students finish one plot early then let younger students pick a new plot to investigate.

Adjustments for Age:

5th – 8th

- Add other countries or have more facts about the subjects, help the little kids locating the items.
- Older students can fill out the more difficult questions

2nd – 4th

- Can fill out the drawing portions of the worksheet and count the plants

K – 1st

- Older students can help these students write down the names of the countries.

Supplementary Activities:

1. Once all students have finished, layout the world map. Have the younger students point out where the countries are on the map. Some of them may be familiar with the mapping activity they did on Tuesday, but for newer countries, the older kids and interns can help point them out.
2. If there is time left, the teacher will say the name of a country in the garden, and the student groups will have to quickly find where that country is on the map. The first groups to find the plot with that country wins! They can play a few rounds of this. Make sure the students WALK to each plot - running in the garden might cause injuries.

Things to grow and weather

Week 2: Students will understand the aspects of soil, compost, water cycle, and real-world implementation using the skills of scientific observation.

Soil Activity

Applied NGSS Science Standards:

Planning and Carrying out an investigation on various soil samples and methods of composting.

Obtaining, evaluating and communicating information on the process of composting.

Learning Target: Students will understand the aspects of soil of how material flows through soil, the relationship between plants + soil. Additionally, they will be introduced to scientific observation and what it takes to create compost effectively.

Sub-Learning Target: This means giving an introduction on observational drawing, students practicing observational drawing based on a photograph, introducing soil types, composition, understanding soil balance, introducing compost, composition of compost, a discussion of why soil & composting is important, then a reflection on what they have learned for this lesson.

Content Background: Scientific drawing is a necessary tool that can teach one to observe the world as a scientist would. They will be introduced to the concept in this lesson, then practice scientific drawing hands-on during Thursday afternoon and become better drawers for the Sprout Seeds Weekly Growth Chart.

Soil is the foundation of everything in a natural landscape. Plants, animals, human civilization, all depend on soil one way or another. This lesson will explain the significance of soil to the students of this camp, how to understand the differences between soil A and soil B and why that's important for growing vegetables and flowers, or why that soil is important for capturing and filtering polluted road runoff. In the afternoon, the students will be able to play with the soils and feel the differences.

Combining this soil lesson with compost will give the essential knowledge to create compost by involving students in the discussion about the carbon and nitrogen function in soil and its importance in composting, they will practice composting hands-on in the afternoon.

Materials:

- Percolation test video
- Compost video for younger audience (15:40 to 16:40)[7]
- Pencils
- Colored pencils
- Paradise Parking Plots Notebook

[7] Videos are also embedded in the PowerPoint presentations.

PowerPoint:

Scientific Drawing PowerPoint

Week 2 Tuesday Morning PowerPoint

Lesson Prep:

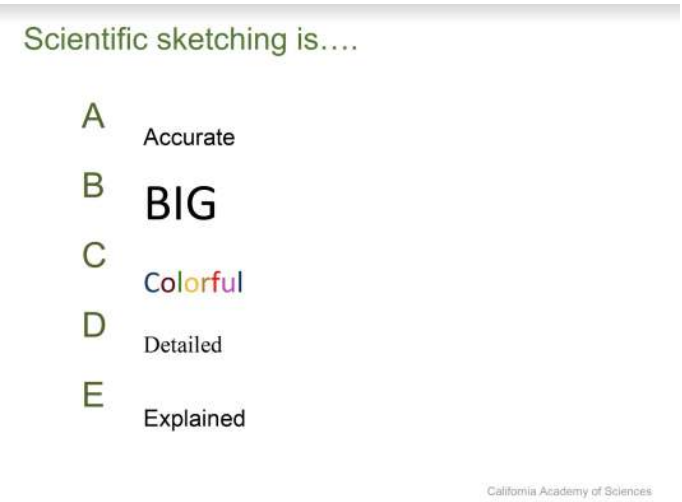
1. Gather the necessary materials as listed above.

Activity:

Observational Drawing

1. Review the plant pot activity to do in the Sprout Seeds Weekly Growth Chart. If there is not enough time to do the activity in the week, mention the activity.
    a. For drawing: Draw the plant. Color the plant.
    b. For how tall: Measure the plant in cm.
    c. Observations: Use vocabulary pertaining to that week. For little kids, mention simpler vocabulary (tall, short).
2. Give introduction and teach on observation and why this is an important skill as a scientist with the observational drawing PowerPoint.

3. Observational Drawing. (K-8th)
    a. Show pictures of a plant (from powerpoint).
    b. Have students draw the picture in their Paradise Parking Plots notebook. Interns will draw the picture on the screen. Share observations and drawing with class.



Soil Type

4. With soil PowerPoint, introduce each of the soil types. Try fill in the blank using a word bank or have them guess what poorly compacted soil means for the picture stories. If applicable, play a video that shows the soil texture of each soil type. [8]
    a. What was the soil like in your country? Share the soil in Washington.

Composting

5. Introduce composting. If applicable, play video that introduces composting. [9]
    a. Soil needs a balance of carbon and nitrogen, called the C:N ratio
        i. Too much carbon, and it's too dry and won't break down
        ii. Too much nitrogen and it gets stinky and wet
    b. Discussion on what carbon and nitrogen are
        i. C and N are <u>elements</u>: the smallest pieces of material that make up things
6. Show the kids examples of carbon-rich materials that are common like paper and cardboard. We used the picture below and had students read off what was on the picture.

I. Charcoal, newspaper, wood chips.
- Ask what can be observed about C from these materials

ii. show examples of nitrogen-rich materials (Food scraps, plant material, grass clippings)
    a. Putting these in jars will reduce mess a 'yuk' factor but we would suggest putting them out on the table to show the kids online

iii. Ask what can be observed about N from these materials

[8] The PowerPoint has these videos recorded by the teachers.
[9] This video is specific to the garden.

7. Discuss with the students. What did you all notice? How does compost feel compared to potting soil? What do you think is the best soil for growing a carrot or a tomato or a tree? Why do we make compost?

8. *Reflection*- What did we learn? For the older students write a reflection in their notebooks. Younger students draw what they have seen that morning.

    a. Have the students present on the most interesting drawing they made from the activity. What they drew, why they drew it (what caught their attention about it?), and a question they have about the object after drawing it.

Adjustments for Age:

5th – 8th

- Those students who know a little more can be leaders for their families.
- Vocabulary. Percolation test.
- Restrict materials to pencils and colored pencils.

2nd – 4th

- We should be able to understand the main purpose of soil, but will still need to be far more demonstrative, physical in explanations rather than verbal. Vocabulary.
- Restrict materials to pencils and colored pencils.

K – 1st

- Entirely sensory experience.
- Rely on the "Peppa Pig" video in google slides to explain compost
- Crayons and stickers

Supplementary Activities:

- Introduce a song or book about composting, soil, or scientific observation.
- Include some facts about scientific observation in regards to big names that students will recognize (NASA).
- Discuss with the students the connection between soil and the plant that they have.

Soil Crafters

Applied NGSS Science:

Developing and using a composting model, to develop an understanding on what creates nutritious compost.

Planning and carrying out investigations on various soil and compost types.

Learning Target: Students will understand the characteristics of soil types, what carbon and nitrogen are, and how to use our understanding of them to make the effective compost mixture.

Sub-Learning Target: This means the students will observe various soil types through touch and sight, and create compost.

Content Background: Compost is an essential tool for organic gardening: not only does it get rid of garden waste, it also returns essential nutrients back to your crops, recycling your soil nutrients and closing the loop. This lesson will teach about the carbon and nitrogen function in soil, its importance in composting, and how to create your own home compost.

Materials

- Carbon-rich materials (newspapers, charcoal, wood chips)
- Nitrogen-rich materials (food scraps, grass clippings, plant material)
- Watering can or water bottle full of water.
- Pictures or videos of soil microbes.
- Plastic containers (or trays)- in the shed
- Gloves

Lesson Prep

- Have the students put on gloves.
- Have samples of each soil ready.

Activity:

1. Introduction- Have samples of the soil (Poorly compacted clay soil, Vegetable Garden Soil, Cedar Grove Compost, GroCo, and VermiCompost) that was introduced in the morning. Let the students play with it.
    a. What do they notice?
    b. How is each soil different in feeling?

2. Create compost- One mound will have nitrogen materials, the other mound will have carbon materials. Put a carbon material in their container and the nitrogen into a plastic container.
    a. Take clear, plastic bin and fill with the proper ratio of brown (C) and green (N) material
        i. Typical ratio is 3:1 brown to green material
            1. However, varies based upon materials used
        ii. Lay down in alternating layers of brown and green material
            1. Add soil in between each layer as a starter culture
    b. Water until moist (like a squeezed-out sponge) but not soaked (it shouldn't drip if you squeeze a handful of it
        i. mention that since the soil is alive, it needs water
        ii. also mention the holes in the bin are for air
    c. You can create an experiment by repeating this process, but with varying ratios of green and brown material

Supplementary Activities:

- Check out the different compost bins and briefly discuss/demonstrate how they work.
- Check out garden beds to see how plants are growing in certain soils.

Adjustments for Age

5^{th} – 8^{th}

- explain and go more in-depth on things like the carbon cycle and nitrogen cycle

2^{nd} – 4^{th}

- Introduce vocabulary that would be hard to understand in online class. Like ratio, and carbon to nitrogen.

K – 1^{st}

- More visual demonstration and general descriptions.
- Consider storytelling for the carbon and nitrogen piece
    - There is a hungry bacteria named "…" who is looking for food, but he only eats certain kinds of food (introducing carbon and nitrogen-rich materials).

Evaporation, Condensation, Precipitation

Applied NGSS Science:

Developing a dance and using it to model the water cycle.

Asking questions about how the water cycle is part of our natural environment and defining problems with excess and not enough rain fall.

Learning Target: Students will learn about the water cycle and be able to identify the three main stages of the water cycle.

Students will then be able to act out the different stages of the water cycle.

Students will be able to describe the water and plant cycle.

Sub-Learning Target: Students will be modeling the water cycle through an interpretive dance, and understanding the connection of the water cycle and the plant cycle.

Content Background: The water cycle is an important element of a garden. Students might wonder why it is rainier in Washington but not in other parts of the country or the world. The water cycle also affects what plants are able to grow here versus others.

Materials:

- National Geographic graphic
- Phases of water interactive Gizmo
- Water Cycle Song #1
- Water Cycle Song #2
- Brainpop video

PowerPoint:

Week 2 Thursday Morning PowerPoint

Lesson Prep:

- Before class, the teacher should come up with different actions to represent each stage of the water cycle - the goal is to make each step a part of a dance.
- Be comfortable operating the links above in the “materials” section of this lesson.
- Create a free trial gizmo account in order to operate 2nd link in the “materials” section. Be comfortable incorporating the water cycle song into your presentation. Have the giant water cup ready on a nearby wall. Upload youtube hot plate experiments on Google classroom and let students know they should watch it before the lecture.

Dance[10]:

1. Wiggle hands up for evaporation
2. Hold an imaginary sandwich for clouds that form in condensation
3. Wiggle hands down for precipitation
4. (5-8th graders only- create flower shape sprouting with hands for transpiration)

Activity:

1. Introduce the topic by asking students what kind of weather they have seen in Washington. What is the weather right now? What is the weather like in the winter? What was it like back in your country? What is your favorite weather? Give this about five or ten minutes so students can share their answers to all the questions. (Students can "raise their hand" to verbally respond or put their response in the chat). Have students read the picture stories, explain.
2. Talk about how in Washington, we get a lot of rain. Have them guess how much rain is falling in Kent.
3. We do get a lot of rain, but why do we get so much rain? How do rain clouds form in the sky? Ask the students to see their answers. Once you've collected some answers, tell the students that we get rain because of water from the ground. Show them "Water Cycle Song #2".
4. Introduce the water cycle dance. Time to demonstrate precipitation (waterfalls down), evaporation (water rising from the ground), condensation (water turns into a cloud), transpiration [5-8th only] (plants sweat the water out). Use hand signals, be visual.
5. Quiz the students using the, "Can you Guess the Phase" slide which includes animation.

6. Open up the second linked gizmo and explain the phase changes to the student as if there is a hot plate there.
7. Bring up the National Geographic picture and explain to the kids how the experiment was just like the water cycle in real life. Focus on this for the 2nd-4th group.
    a. Ask a volunteer to read what you have highlighted.

[10] For this activity and further activities, there will be a dance. Students can refer back to this dance throughout the rest of camp.

Evaporation

Energy from the sun heats up the surface of the Earth, causing the temperature of the water in our rivers, lakes and oceans to rise. When this happens, some of the water "evaporates" into the air, turning into a gas called "**vapour**". Plants and trees also lose water to the atmosphere through their leaves. This process is known as "**transpiration**".

Condensation

As water vapour rises up high into the sky, it cools and turns back into a liquid, forming clouds. This process is called "**condensation**". Currents high up in the air move these clouds around the globe.

8. **Introduce what plants need to grow**- Water, light, soil, air. For the 5-8th group use this Brainpop video.
    a. For the older kids, make them think about what a plant needs to grow and explain how certain plants need more or less of these.
        i. Big plants need more resources than smaller plants (space, sun, water)
        ii. Shade tolerance varies with all plants. Put hands over the plant to signify shade.
    b. For the middle kids, create a list with them of what a plant needs to grow and then briefly signify that different plants need different amounts of each.
    c. For the younger kids, insert clip arts onto the screen that will show what a plant needs.
9. Use Water Cycle Song #1 & Water Cycle Song #2. Encourage students to sing along as you demonstrate.

Adjustments for Age:

5th – 8th

Understanding Rainfall Intensity and Duration (5th-8th grade ONLY)

1. Just like rain, we are all the same (humans), but uniquely different (like the different types of rainfall). Engage students in conversations about differences in the rain. Have a student or teacher create a list of what came out of the conversations.

   a. “What was rain like in your country?”
   b. “What have you noticed about the rain here?”
   c. “Is all rain the same?”
   d. Talk about rain intensity and rain duration
      i. Intensity: amount (depth) of rainfall over a given period of time
      ii. Duration: the length of time precipitation occurs
2. It may be good to discuss...
   a. That floods are not “bad”, they are actually very important in natural systems! They are only problematic when the human element of towns and cities are introduced.
   b. Even with the water cycle a lot of flooding happens, without cities this would be beneficial to farmlands because the soils hold the moisture well, allowing us to grow a wide variety of crops

- Students can fill out a blank water cycle picture in class with the teacher and other students.

2nd – 4th

- Focus on the National Geographic Graphic. This will tie students from what they are reading to the concept in real life. Some students also get excited at the prospect of reading.
- Do not go into depth with Gizmo, share concepts, then ask for a real life example.
- Encourage them to show any areas of their home where a water cycle may take place (plants, an accidental spill of water on the carpet).

K – 1st

- NO gizmo or song
- But walkthrough the dances of the water:
- Use the whiteboard feature in the beginning of class for the students to draw their favorite season.
- talk about how weather and the water cycle interact
- Can show the music video if there is time.
- Drawing and the water cycle dance will take up most of the class time.

Supplementary Activities:

- For the older kids, if they are done with their experiments early, instead of showing the picture of the water cycle, the students can draw their own and share them with the class.
- Older students may take turns showing the class their own water cycle in their kitchen using their stove, pan, glass, bowl, and water

Planning a Garden

Applied NGSS Science:

Developing a model of a potential garden plot and using the model to understand the differences between a variety of plants.

Constructing explanations on how plants need different conditions to thrive and designing solutions for how to accommodate all those needs within one space.

Engaging in argument from evidence on why their garden plot model makes sense.

Learning Target: Students will learn the process of planning out a garden plot.

Students will practice and become more adept at the skill of scientific observation through critically examining real-world objects and translating them into representative drawings.

Sub-Learning Target: Students will be observing various garden plots and through observational drawing, create a model plan of a possible future garden based on the observations from other garden plots.

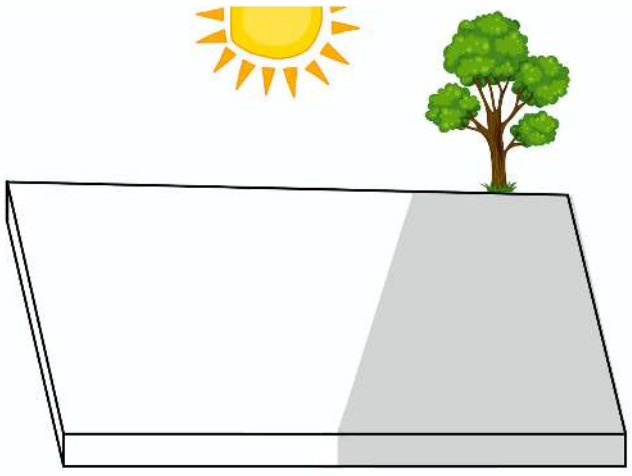
Content Background: Gardening is a process. It takes a long time and a lot of preparation and patience to go from seed to flower, or seed to harvest. To give yourself the best chance for success, you must have a reasonable plan in place for when you want to get your gardening space ready, for when to plant seeds, for when to water, so that you maximize your return for all the time spent gardening. From the factors that directly affect your decision making of what goes where, to when you should expect your harvest, this lesson will teach the campers how to plan out your garden for the growing season.

Scientific drawing is not simply an archaic method of communicating information made moot by the modern photograph, but rather, an important tool that can teach one to observe the world as a scientist would. Students will go outside to explore and find an object they are curious about. They will then make observations about the object through carefully examining and drawing it. They will make notes, point out curious pieces of the objects, and share their findings/drawings. This has been explained in the morning, but will be the first time the students practice scientific drawing hands on.

Materials:

- Colored Pencils and Markers
- Paradise Parking Plots Notebook
- Stamps of plants and bugs
- Worksheet with Garden Plot
- Plants that Thrive in Sun vs. Shade
- Stapler

Print Out:



Lesson Prep:

1. Print out garden plot graphic for each student (does not need to be in color)
2. Print out "Plants that Thrive in the Sun vs Shade" for teachers if needed.
3. Gather materials. Each teacher takes one family (2-3 students) at a time to the garden plots.

Activity:

1. **Introduction-** about what a garden needs.
    a. Ask the students what a garden needs.
    b. Answer should be food, water, light, soil, space

1. **Observe and draw a garden plot-** take 5~10 minutes to write/draw observations.
    a. Give a demonstration that models how to create a scientific drawing from observations.
    b. Students can use the looking glass to take a closer look into each station (One looking glass per student)
    a. Ask them what they notice about each plant- size, shape, color, where each one is being located, what soil is being used.
    b. They observe a garden plot and are able to draw it in their Paradise Parking Plots notebook.
2. **Drawing a garden.** ~10 minutes

    All students may use the stamps and may use the template provided.

    a. Give the oldest age group (5-8th) the freedom to create their own garden in their notebooks or use template.
        i. The garden has to have a water source, sun source, a tree & space. Try to have students create their own template, but if needed, teachers can supply students with a printout as well.
        ii. Place the plants: lettuce, radishes, and spinach. Can add more plants if needed.
    b. The second oldest age group (2nd-4th) can have a template.
        i. Printout with sun source, a tree & space.
        ii. Place the plants: lettuce, radishes, and spinach with marker/stamps. Can add more plants if needed.
    c. Youngest age group (K-1st) must map out where they would put each plant with the help of the interns
        i. Printout with sun source, a tree & space already given.
        ii. Place any plants or bugs using the stamps.

3. **Reflection**
    a. Pick a few kids to present what they drew/created. Pick all of the students if there is enough time.

Adjustments for Age:

2nd – 8th

- See “Drawing a garden” activity.

K – 1st

- Supply more help from the older students/ teachers.
- See “Drawing a garden” activity.

Supplementary Activities:

- Measure the plot
- Have student the rain garden and identify species
- Have the students eat the produce

Natural Rhythms

Week 3: Students will learn about various natural cycles, such as the water cycle and weather, and understand how these cycles impact our environment and livelihoods by engineering models to mimic natural rhythms.

Seasons, Climate, and Water Cycle[11]

Applied NGSS Science Standards:

Developing a flashcard story and using it to model the changing of the seasons.

Engaging in argument from knowledge of the seasons as evidence to complete storyboards.

Learning Target: Students can understand the seasons from their native countries to Washington State, and learn the water cycle.

Sub-Learning Target: This means connecting seasons back home to seasons in Washington, using word banks to describe different seasons, introducing weather, climate/climate change, exploring water cycle map collections, and introducing water cycle vocabulary words.

Content Background:

Seasons in the northern hemisphere and southern hemisphere are always the opposite of each other. Students will learn to realize the differences between weather back home and weather in Washington. The weather in Washington includes a lot of rain, and students will know where our rain comes from and where it goes.

Materials:

- Seasons song
- Climate Change According to a Kid video
- Zoom Whiteboard
- Paradise Parking Plots Notebook
- Colorful visuals[12]

PowerPoint:

Week 3 Tuesday Morning PowerPoint

Lesson Prep:

- Students should have their Paradise Parking Plots Notebook ready for the lesson

Activity:

Seasons

[11] Students really like this lesson.
[12] the following plants in the lesson plan

1. Review the plant pot activity to do in the Sprout Seeds Weekly Growth Chart. If there is not enough time to do the activity in the week, mention the activity.
    a. For drawing: Draw the plant. Color the plant.
    b. For how tall: Measure the plant in cm.
    c. Observations: Use vocabulary pertaining to that week. For little kids, mention simpler vocabulary (tall, short).
2. Mention what a season is. Ask students what the seasons were like in their home country?
    a. In Washington, seasons are like this...

3. Students and interns go through the different seasons, encourage them to use different vocabulary when describing each season. Go through the fill in the blank slides.

4. Creating storyboards for the different seasons.

a. Students and interns group the images into storyboards. Insert pre-recorded video on how to create a storyboard. Students create storyboards with crayons on their own sheets of paper. Storyboards group together all four seasons that represent how the students view them (ex. one student may have cherry blossoms for spring while another may have bees)

Climate Change

5. Introduce what climate is. Ask students how the climate differs from Washington and their home country.

6. Discuss weather versus climate. What is weather? What is climate? What are the differences between these two? Have students lead the discussion. Play this video.

Water Cycle Maps

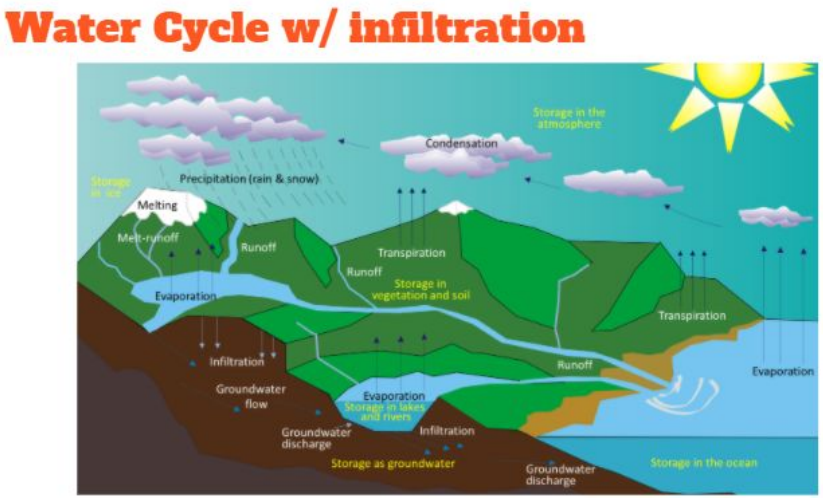
7. Students explore map collections. Each group has the same set of weather-related maps, scale jumping with a focus on temperature and precipitation (Kent, King County, Puget Sound, Washington State, United States)

a. Build-in math facts, stories, and related vocabulary: annual, inches, elevations, percentages, temperatures
b. Ask questions to lead to the conclusion that Mill Creek is greatly affected by rainfall (flooding) due to the school being at the bottom of a hill. Explore where else rainfall can end up. For 5th - 8th ask how the community garden has helped reduce flooding in homes on the hill and Mill Creek.

Water Cycle Story & Vocabulary

8. Show that there's more to the Water Cycle. Do the water cycle dance again (refer to week 2 Thursday morning lesson plan). But indicate that we need to add some new words to the water cycle series.

Review the water cycle using a whiteboard or drawing software on Zoom and show the following vocab as a visual.



c. Rain **infiltrates** into the **groundwater**, (pictures of community pumps and wells from other countries?)
d. Water that infiltrates into the soil is **taken up** by plants
e. The plant life cycle **adds organic matter** that **buildsExcess** water that cannot infiltrate (no room left in the spong!) is called **runoff.** It flows into (**freshwater) streams, rivers, lakes** and **Puget Sound** (**saltwater ocean**).
f. **U**p the soil and holds water like a **sponge**

Adjustments for Age:

5th – 8th

- Focus on the water cycle activity and Water Cycle & Vocabulary story.
- Discuss in-depth map questions.

2nd – 4th

- Review main ideas on the Seasons activity.
- Review general ideas in the Water Cycle activity.

K – 1st

- Focus on the Seasons activity.

- Do not do the storyboard with them, instead have them draw out the different things they can find in each season. It's kind of like doing a storyboard as a class.
- Review the water cycle, have them go through the water cycle dance (refer to week 2 Thursday morning lesson plan).
- Avoid flashcard story activity if students are not ready for it.
- Always take time to ask about what they know about seasons, weather, etc. If they can't give a definition, they will usually know about examples.

Irrigation Systems

Applied NGSS Science:

Developing models of water irrigation systems and using them to demonstrate how the irrigation system at PPP[13]

Constructing explanations on various irrigation design ideas and designing solutions for irrigation issues.

Learning Target: Students will learn what an irrigation system is and better understand how irrigation systems work by learning the installation process and importance of the garden's irrigation system.

Sub-Learning Target: This means by learning the story of the garden's irrigation system, and engineering scientific models that reflect the real-life application of irrigation systems within the garden.

Content Background: For a garden to grow it needs to have a consistent source of water. Lots of clean water is already supplied through rain, however, it doesn't rain all the time and it's expensive to pay for water. Therefore, we are harvesting rainwater, by storing it and using irrigation systems as a cost-efficient and more sustainable method to water the garden.

Materials:

- PVC pipes
- Clear plastic trays
- Large pipe
- Flashcards/picture stories of Paradise Parking Plots construction
- 2 Watering cans

Lesson Prep:

- Gather materials and set up stations beforehand.
- For Station 1: PVC pipes, plant watering thing/ hose, etc should be placed near designated garden beds
- For Station 2: partial tour/ flashcards

Activity:

The lab introduces what an irrigation system is and how it works. While exploration and storytelling parts are to explain how the irrigation system is applied to the garden.[14]

Storytelling

1. **Irrigation System Scavenger Hunt:** If the plants in the garden need lots of rain in the summer, but it doesn't rain very much in the summer, how can we water them? *What do you notice?*
2. Use picture stories from different stages of construction of the rain harvesting system. Add new vocabulary to the back. Set the picture stories on the ground and tell a brief story of the installation.

[13] Paradise Parking Plots
[14] The lab introduces what an irrigation system is and how it works. While exploration and storytelling parts are to explain how the irrigation system is applied to the garden.

i. Depaving
ii. Cisterns coming onsite
iii. Trenches being dug
iv. Pipe being laid
v. Hose hydrants installed
vi. Water spraying

Lab

3. **Irrigation System Lab:** Explain pieces of activity.
    a. Connection to the garden. Let them think.
        i. ID Cisterns (watering can)
        ii. ID Garden beds (trays)
    b. The family does the activity together
        i. Assign jobs.
            1. A person who will get the materials (younger students)
            2. Team leader - (Either the guardian or older student)
            3. A person who will return the materials. (Younger students with the help of older students)
    c. Give directions
        i. Start with the biggest pipe
        ii. Show them the ending points
    d. Get materials
    e. Construct a water delivery system using PVC pipes
        i. Must start at one location and end at the "garden" (trays) that it must water.
        ii. Have variations of pipe length and redirection at the different stations (two trays side by side,one tray above the other tray, three trays side by side)
        iii. Clean up
    f. After the activity, relate to the real water system that is on-site.

Supplementary Activities:

- Create problems in their PVC pipe layout. Such as: This layout needs to have two outlets, one on top and one on the bottom.

Adjustments for Age:

5th – 8th

- When students are stuck, have them answer their own questions. Where is the problem? How can I use what I know (i.e. gravity and water pressure) to make this PVC pipe work? What parts do I need?

2nd – 4th

- These students are discovering what parts work together. Have them work with K-1st students to gather materials that will work for their layout.

- When these students are stuck, ask them if their specific part will help with the layout/what part they are missing.

K – 1st

- Have students focus on helping their older siblings create the PVC pipe activity layout.
- These students will be gathering materials the most.

The Garden Needs Water

NGSS Science:

Using mathematics and computational thinking to estimate how much water do various quantities and varieties of plants need.
Obtaining, evaluating and communicating facts and information about the plant life cycle.

Learning Target: Students will understand how water moves in plants, pipes, and the importance of the volume of water. They will also be able to identify different stages of the plant life cycle.

Sub- Learning Target: Students will calculate mathematical water quantities based on examples from the garden and create predictions on the celery lab to practice STEM skills and apply them to the real world. Students will also discuss the various stages of the plant life cycle using diagrams and examples.

Content Background: At this point of the summer academy, students know of the water cycle, but have no concept of the amount of water needed for the things around them. In this lesson plan, students will understand the concept of underwatering/overwatering, and understand how water moves in plants and pipes. These concepts will give students the basic knowledge to be successful in gardening and gardening systems that they may engage with in the future.

Materials:

- Celery Lab video
- Plant life cycle video.
- Pollination video
- Two-gallon and a five-gallon bucket filled with water.
- Virtual Whiteboard for students[15]
- Paper[16]

PowerPoint:

Week 3 Thursday Morning PowerPoint

Lesson Prep:

- Prepare materials
- Practice using share screen

Activity:

Celery Lab

1. Play this celery lab video.

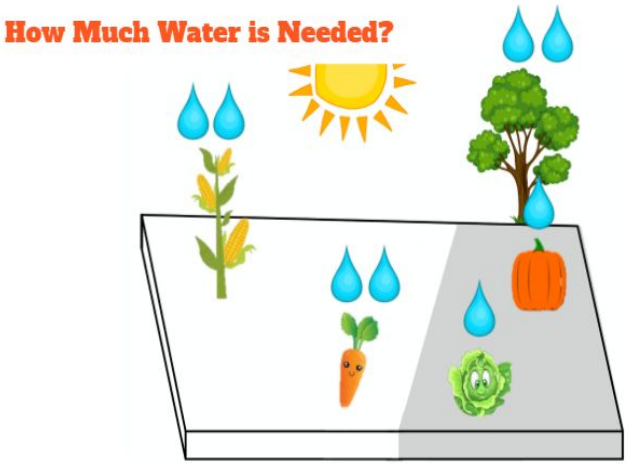
[15] Write down their estimates on the whiteboard.
[16] For students to make drawings for their plants, colored pencils. Students can hold up the paper or screen share their whiteboard.

2. Discuss what happened in the video. Why is the red water now at the top of the celery? Students then share hypotheses by writing it in the chat or having them speak out.
3. Share a story by showing many images of soil structure (water penetration) plant roots (tips take up water molecules) as well as diagrams of the cell walls where water is lifted up, and through photosynthesis (transpires).
    a. Students refine their initial hypotheses and practice telling the story using whichever flashcards that are most useful.

Amount of Water

(K-1) : Lots of drawing.[17]

a. Have the students draw a plant they've seen in the garden.
    i. If they don't know what to draw, give them prompts (ex: draw a tall plant). Within the garden many different plants coexist in one garden plot. Diversity is a good thing, plants help each other grow. However, different plants need different accommodations (i.e different amounts of water).
b. Introduce pollination (terminology : pollinator, pollination, nectar).



(2-4th): Use visuals to explain.

a. Share the concept of overwatering, good, and underwatering using videos/pictures.
b. Ask the brain teaser: How much water is in a person? (70%)
c. Comparing a plant and a person, which one has more water?
    i. A point to include: that although people have more water overall, plants proportionally have more water compared to people since plants biologically are made up of more water than bodily organs.
d. Ask about the students specific plants and how much water it might take for each specific one.
    i. Share flashcards of actual plants growing the garden.
    ii. Do different plants require different amounts of water?
e. Discuss what happens to the water within these plants if we have a week of sunny, hot weather, and no new rain for the soil and the roots?
    i. Do plants in the sun need more water or less water? Answers should be more.

(5-8th): Estimating: ask the students

[17] Drawing takes a long time, at least 20 minutes if the whole class is drawing on the zoom white board

1. Ask the students how many gallons of water are in humans? Students estimate how much water is in each of us using cleaned-out plastic milk gallon jugs filled with water. (On camera try lifting a two-gallon bucket and a five-gallon bucket as well, exaggerating the weight.) If I am 70% water, and I weigh 97 pounds, how many gallons of water is in me? Students share estimates with virtual whiteboards.

   When doing the calculations, demonstrate your work to the class on a virtual whiteboard and if a student wants to share their work, you can draw what they did or they can screen share. Only some of these questions below need to be answered:

   a. Estimate the same for giraffe, hippo, dog, cat.
   b. Estimate the same for an apple, orange, grape, watermelon
   c. Estimate the same for a head of lettuce, ear of corn, carrot, squash
   d. What about these plants? (Share flashcards of actual plants growing the garden. The same images can be used for a plant scavenger hunt in the afternoon) Students make a drawing of their plant. 5
   e. Estimate the water that we might need for all the plants in one plot at the garden, then multiply by 44 plots.
   f. What happens to the water within these plants if we have a week of sunny, hot weather, and no new rain for the soil and the roots? Where does the water go?
   g. Your watermelon weighs 20 pounds but only 14 pounds of that is fruit. On average, 90% of watermelon flesh is water. 1 Gallon of water is 8.33 pounds. How many gallons of water is in this watermelon.
2. Also calculate if the plants in the garden need lots of rain in the summer, but it doesn't rain very much, how can we water them?
   a. How many gallons do we need?
   b. How often is it best to water the plants?
   c. What happens if we water them too much? Or not enough?
   d. We have lots of water in the fall and winter, but that's not when the plants need it the most. Can we store it somehow for when we need it?

Plant Life Cycle

1. Play this plant life cycle video.
2. Briefly discuss what happened in the video.
3. Ask for student volunteers to read the different cycles on the screen. Insert progressive plant pictures. Seed, Germination, etc.

4. Explain the difference between fruit we can eat (vegetative) vs fruit we can't eat.
   a. Food crops make fruit that we can eat!
   b. Flowers make fruit but we can't always eat them!

Pollination

1. Play this pollination video.[18] Have questions on the side that they can think about, these questions are below with answers:
    a. From the video, ask, what is pollen?
        i. Fine powder produced by plants when they reproduce. Used to fertilize other plants.
    b. Ask students what are different types of pollinators?
        i. Bees
        ii. Butterflies
        iii. Can the students think of more?
    c. Ask students how does pollen move?
        i. Insects move pollen.
    d. Ask students how do seeds move?
        i. Animals move seeds.
    e. Briefly discuss that there are female plants and male plants.

Adjustments for Age:

5th – 8th

- See "Amount of Water" activity.
- Discuss the difference between vegetative and fruits.

2nd – 4th

- See "Amount of Water" activity.
- Introduce insects and animals as a part of pollination.

K – 1st

- Focus on the celery lab and see the "Amount of Water" activity.
- Skip pollination activity that the 2nd-8th group is doing, and introduce simple terms using a picture/animation.

[18] For the pollination video, you do not need to go all the way through.

Observations and Water Movement

Applied NGSS Science:

Developing a celery lab and using the model to understand the concept of water uptake in plants.

Planning an investigation on the plant life cycle including pollination and carrying out an investigation on the interaction between the plant with its environment.

Engaging in argument on how to determine healthy, from unhealthy plants based on empirical evidence.

Materials:

- Celery.
- Mason Jars.
- Red food coloring.
- Water. Scissors.
- Water nozzle
- Looking Glass
- Chalk

Learning Target: Students will learn about water movement from the air (rain) and water movement from the ground affecting plants and how water moves in plants. Students will also observe plants in varying stages of the plant life cycle. Students will understand the importance of water and impacts of lack of water.

Sub-Learning Target: Students will conduct investigations on various garden plots, and explain the impacts of various environments (no water, too much water, no sun) on plants. Students will also identify and describe plants in various stages of the plant cycle including pollination.

Content Background: This will be the second time that the students have done a scavenger hunt. This one will be about the movement of natural water affecting plants. The students will have seen or done a celery lab prior.

Lesson Prep: STARTS THE DAY BEFORE: Fill large mason jars with 2 inches of water and lots of red food coloring. Buy fresh celery preferably with a number of the leaves still attached. The day before this lesson, cut the stalk bottom off about a half-inch up to ensure clean openings into the xylem cells. Leave overnight.

- Gather materials.
- Create chalk lines for the students to follow from the entrance of the church to a garden plot.

Activity:

Celery Lab

1. Introduce the celery. They will be able to understand the difference first hand of how water moves in plants.
    i. One that has a color line

ii. One that does not have a color line- natural

Plant observations

2. Have the students follow one of the chalk lines to one garden plot. Teacher could be the leader unless there is a 5-8th student in the group.

i. Observe what plants they recognize and which ones they don't.
ii. Lead them to the conclusion of which plants need specific conditions because of where they come from.
    1. Why is the plant brittle and dry? Why is one full with water?
iii. Observe plant height for the water flows as rain activity.
iv. Observe which plants get full sun, half sun, partial sun (conditions)

Where the Water Flows as Rain

3. Pour water on a vegetable using a water nozzle.

I. Students will see where the water is moving. Connection to which plants get water first. (Ex. Shorter plants get water first due to their leaves being shorter and not blocking the rain from infiltrating the soil, taller plants get water later due to their leaves being wider and blacking the rain from infiltrating the soil)

Ii. Students use the looking glass to see where the water is moving on the plant.

Pollination

4. Bring the students to an area where there is flowers and pollinators

I. Quiz the students on some vocabulary words they learned in the morning

Ii. Show the students different stages of the plants (pre-pollinated, post pollinated)

Iii. Male flowering plants have pollen, female flowering plants develop the seeds.

Plant Cycle [19]

5. Find a different garden plot and review vocabulary with the students

a. Seeds - the inner plant is protected by a hard layer until the seed is in the right environment to grow

[19] Not all plants strictly follow this cycle

b. Sprouting- the plant begins to emerge as a small leaves and a stem
c. Vegetative - the plant is growing bigger and has more leaves but hasn't grown flowers or fruits yet.
d. Flowering- the plants have grown flowers
e. Pollinated - the flowers have been pollinated and are developing fruits or seeds.
f. Corn plant life cycle: leaf mode, flower mode (flower on top of corn plant), fruit mode (the ear of corn),
    i. Pollination happens when the wind carries corn flowers to the bottom of the corn plant, then grows the ear of corn.

Planning/Engineering:

Week 4 Objective: Students will create an understanding of the connection between the water cycle, watershed, natural landscapes, and water pollution by creating watershed models and analyzing the similarities.

Watershed (Maps, Diagrams, Runoff)

NGSS Science:

Creating a model of how watersheds are developed by creating a graphic of natural landscape and observing where the water runs.

Analyzing various diagrams of watersheds and creating a definition of what is a watershed and what a watershed looks like.

Learning Target: Students will be able to find out the connection between the water cycle and watersheds. They will also be able to analyze various diagrams of watersheds to create a definition of what a watershed is, and what a watershed looks like.

Sub-Learning Target: This means reviewing a water cycle dance introduced in the previous week, analyzing watershed animations and the connection between water cycle and watershed, pointing out vocabulary in watershed diagrams, and watching watershed introduction videos.

Content Background: Rain is a common weather occurrence in Washington. Where does that water come from? Where does all that water go? Rain is part of the water cycle and eventually all that water has to go to a watershed (think of streams, rivers, creeks, etc). Watersheds are bodies of water and they have great significance to our environment and livelihoods.

Materials:[20]

- What is a Watershed? Video
- Watersheds! video
- Paradise Parking Plots Notebook.

PowerPoint:

Week 4 Tuesday Morning PowerPoint

Lesson Prep:

- Pre-load visual aids

Activity:

[20] "Suggestion: offer students paper and pencil to take notes during the lessons, but not required."

K-1:

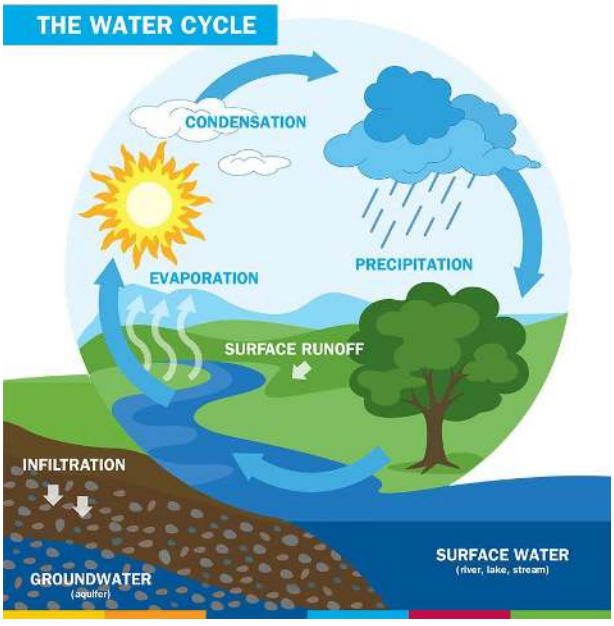
1. Review the plant pot activity to do in the Sprout Seeds Weekly Growth Chart. If there is not enough time to do the activity in the week, mention the activity.
    a. For drawing: Draw the plant. Color the plant.
    b. For how tall: Measure the plant in cm.
    c. Observations: Use vocabulary pertaining to that week. For little kids, mention simpler vocabulary (tall, short).

Watershed introduction

2. Review the water cycle dance, but this time adding in a strong wind coming off the ocean which blows water vapor across the landscape and up against the Cascade Mountains where they condense and become so heavy they fall back down as rain as an animation.
    a. (1.5 sextillion water molecules in one drop of rain. Write the zeros on a big piece of paper) Show a graphic (close up version of a few water molecules, zoom out eventually to a drop of rain.)
    b. Review, infiltration, plant uptake, and surface runoff (either draw or present a graphic of the process in simplified terms)
    c. Use a funnel to represent a watershed, pour water into a funnel and into a glass (glass represents oceans, lakes, rivers, etc..)

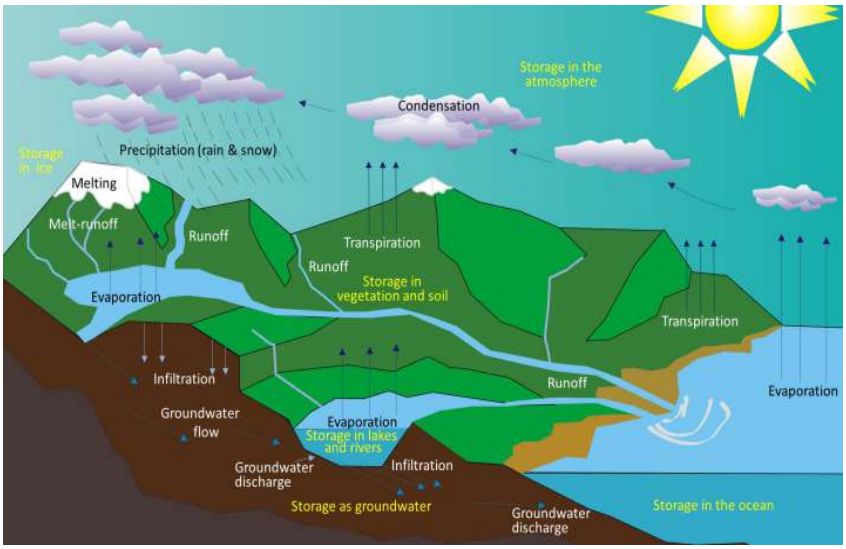
Diagram Analysis

3. The water cycle meets the watershed. Analyze the main ideas on 5-8 different diagrams depicting a watershed.
    a. Work with the students to talk about what is a watershed? What are the aspects of a watershed? (Rain, a body of water, mountains/hills, etc) Ask them to point things out in the graphic.
    b. Make it clear to the younger audience that a watershed is NOT physically a shed with water in it.



2nd-8th

1. Review the water cycle dance, but this time adding in a strong wind coming off the ocean which blows it's water vapor across the landscape and up against the Cascade Mountains where they condense and become so heavy they fall back down as rain. *show this using a whiteboard or drawing software* This explanation shows how watersheds work!
    d. (1.5 sextillion water molecules in one drop of rain. Write the zeros on a big piece of paper)
    e. Review the vocabulary from Week 3 - infiltration, plant uptake, and surface runoff
    f. Use the idea of a funnel to represent a watershed, pour water into a funnel and into a glass (glass represents oceans, lakes, rivers, etc..)



2. Play this video about What is a Watershed? Afterwards, analyze the main ideas on 2-3 different diagrams depicting a watershed.
    a. Practice building a group definition. The water cycle meets the watershed.
    b. Model Definition: The drainage area of a landscape defined by its ridgelines and flowing downhill to sea level where all water ends up.
    c. A Watershed is an area of land where all of the water that is under it, or drains off of it collects into the same place (e.g. The River).

2. Play this video introduction on Watersheds!
3. On screen share pull up the black and white watershed map, KSD map, and Mill Creek map. Students explore maps at different scales of the Green Duwamish Watershed.
    a. Identify the garden, mill creek, downtown Kent, the Green, the Duwamish, and Puget Sound.

Supplementary Activities:

- For the 5-8th group, zoom in and focus on this part of the Watershed! video
- Have students create a watershed (draw it) in their Paradise Parking Plots Notebook at the end of the activity.

Adjustments for Age: See the lesson plan for the adjustments.

Watershed Lab #1 (Clean Water on a Natural Landscape)

Applied NGSS Science Standards:

Developing and using models of how a clean watershed naturally develops

Asking questions about the impacts of the water cycle on a watershed and defining problems involving people and watersheds.

Learning Target: Students can create a model of how watersheds are developed and work.
Sub-Learning Target: This means by creating a model of a natural landscape and observing where the water runs, while assigning roles to create a team aspect among the students via a lab.
Content Background: When it rains, the rainwater flows somewhere. The rainwater flows to lower points in a landscape, and eventually come to form a watershed. A watershed is any body of water that is created from the rain. The students will simulate the process of creating a watershed through the model
Materials:

- Medium size paper
- Spray bottles
- Clear plastic trays
- Blue food coloring
- Water
- Pencil/Markers
- Picture stories of a Watershed

Lesson Prep:

1. Small stations set up for the materials
2. Set up desks for the families to work on (ideally circle tables).
3. Mention to the students beforehand to bring clothes that they don't really care about.

Activity:
Watershed Lab:

a. Students crumple a medium-sized piece of paper, partially un-crumple, and then place in pan
b. Have students pinch their crumpled paper to signify a mountain.
c. Students spray "mountainscape" with spray bottles with blue food coloring to simulate clean rainfall
d. Show picture stories of a Watershed here. Watch how water moves downhill and observe different "watersheds".

Watershed Lab #1

1. Assign jobs
    i. A person who gets materials (younger students)
    ii. Team leader (older students)
    iii. A person who will return the materials (younger students)
2. Give directions

   i. Crinkle papers and use supports (crumble paper) to create landscapes
3. Kids get materials
4. Kids crinkle papers and draw a landscape
   i. (draw trees, maybe an animal, houses, etc)
   ii. Where the paper is more elevated, that's where a mountain or hill should be, lower parts of the paper should be more empty to make space for the water.
   iii. Teachers go around and tweak student's landscapes where needed
5. Teachers go around to each group with a spray bottle and demonstrate water flow
   i. What is the water doing? Where is it going? Where do you think a watershed would be?
   ii. Each of the students can present what is happening in their own landscape (ex: are the homes covered with water? Then the homes are "flooded")
6. Ask the students about the role of the water cycle in their landscape. How does the water get to the mountains? What happens when it reaches the trees? Also ask about what their landscape would look like in different seasons.
7. Mention what a watershed is. *Note: if the student went to the morning lesson, they can connect the dots. If they didn't go to the morning lesson, introduce what a watershed is with the paper.
   i. Water cycle on the landscape.
   ii. The mountain represents the mountain.
   iii. The lake, pond, and rivers all lead to the ocean.

Adjustments for Age

5^{th} – 8^{th}

- Encourage the use of any vocabulary learned from previous lessons
- Also, encourage any connection from this activity to any other of the lessons.

2^{nd} – 4^{th}

- What are some examples of watersheds? (Lakes, streams, etc)
- Have them walk through the process of how a watershed is formed using their model

K-1st

- What parts of the landscape are now blue? What does this mean?

Supplementary Activities:

- If there is enough time, after #6, add in "students could walk through the different ways the landscape changed based on where water flowed. How would humans adapt? Would certain animals migrate? Where to?"

Polluted Stormwater Runoff

Applied Practice of Science and Engineering:

Learn and tell a story about stormwater runoff with a connection to rain gardens.

Analyze a map of the Kent city stormwater pipes and rationalize the use of rain gardens in certain areas.

Create a model for how pollution affects natural landscapes and watersheds.

Ask questions about the impacts of pollutants in a watershed and defining problems as a result.

Learning Target: Students can understand what classifies as water pollution and create a model for how pollution affects natural landscapes and watersheds. Students can understand stormwater pollution solutions and tell a story about stormwater runoff with a connection to rain gardens. Students can give examples of pollution solutions.

Sub- Learning Target: Students will observe different types of pollution, describe various examples of solutions to pollution that can be conducted on an individual level, and use examples to describe the impact varying types of pollution can have on a watershed.

Content Background:

Pollution can get into watersheds from urban environments from various human activities, some areas have higher amounts of pollution than others. Stormwater systems are the main culprit when transferring water pollution to the watersheds, which is why rain gardens are so important.

Materials:

- Prepared flash-cards
- Virtual map.
- Learn About Pollution video
- Pollution Solutions video

PowerPoint:

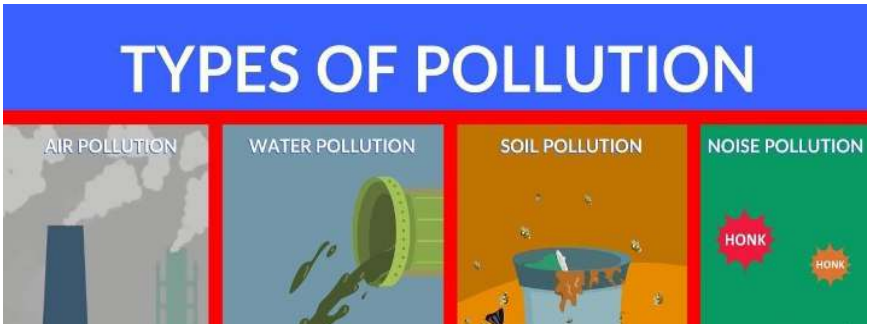
Week 4 Thursday Morning Powerpoint

Lesson Prep:

- Gather materials and any lesson aids (flashcards, etc).
- Prepare PowerPoint slides and add in images for a “key”.

Activity:

What is Pollution?



1. Ask students what they think pollution is.
    - Encourage them to list examples of pollution they see in their daily lives.
2. Introduce the types of pollution (ex. Air, Water, Soil, Noise)
    - Air Pollution: Occurs when harmful or excessive quantities of substances are introduced into Earth's atmosphere (ex. car emissions, chemicals from factories, dust, pollen and mold spores)
        - Who does the pollution affect negatively? Birds
    - Water Pollution: Water pollution is the contamination of lakes, rivers, oceans, aquifers and groundwater. (ex. Industrial waste, sewage, oil pollution, uncontrolled dumping of waste, improper solid waste management, unsafe storage of chemical waste)
        - Who does the pollution affect negatively? Marine animals
    - Soil Pollution: Soil pollution as part of land degradation is caused by the presence of chemicals in the natural soil environment (ex. Fertilizer, insecticides, acid rain)
        - Who does the pollution affect negatively? Plants, insects, land animals that rely on plants (ex. pollination birds, rabbits, butterflies).
    - Noise Pollution: Noise pollution is the propagation of noise with ranging impacts on the activity of human or animal life, most of them harmful to a degree (ex. Traffic, air crafts, construction projects, industries.)
        - Who does the pollution affect negatively? Marine animals. (ex. Orca uses sound to navigate where they are)

Polluted Watershed

3. Working with the students on a PowerPoint slide. Students repeat the watershed activity, but draw an environment with cities, streets, etc. (look at maps and aerial photos of city streets to get ideas)
4. Together with the students, we create a new Powerpoint slide.
    a. Draw mountains, cities, forests, farm fields with the “annotate” button on Zoom
    b. Create a landscape
        i. Ask them to draw out pollution where they think it would be
    c. Insert (cities, streets,etc.) and non-polluting structures (forests, streams, etc.)
        i. Ask how the cities, streets, etc. give pollution.
    d. Put in pollution and ink onto the PowerPoint slide.
        i. Observe where the “ink pollution” is carried. Where does it collect? What areas get the most pollution?
        ii. What are some types of water pollution you can think of?
    e. **It gets worse!** Add bits of plastic, cigarette butts, dirt, car oil, dog poop and make it rain harder still (by adding more droplets of water). Insert a picture of a storm cloud. And try a garden watering can to simulate rain.
    f. Choose a spot with to insert a raincloud) and demonstrate water flow
        - What is happening? Where is pollution going?

5. Watch Learn About Pollution

Stormwater Pollution Solutions

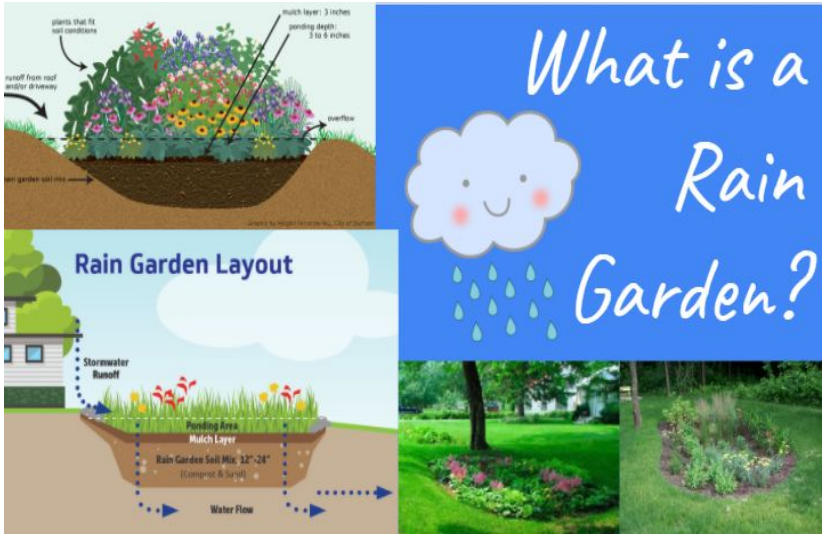
6. Give students a big range of flashcards to sort and analyze that shows all of the examples of stormwater pollution. Sort with the students. **(K-1st).** For **(2-8th),** split them up into small break out groups to pull together images they are drawn to and retell a polluted stormwater runoff story. Then after 10 minutes bring them back to present what they did. 1 person per group can present.

7. Using maps, look for the systems of storm drains, types of pollution, design of streets and curbs, design of rooftops, and downspouts. Explore Mill Creek as well. **(5th-8th grade focused)**

8. Explore maps of impervious surface area as well as city stormwater pipes map. **(5-8th only)**

9. What are the ways to prevent/reduce pollution? **(2nd-4th focused).** Play video about Pollution Solutions.

8. Give students a big range of flashcards and analyze a big range of flashcards that show many different diagrams and photos of rain gardens. Again, they work in small break out groups to pull together images they are drawn to and describe what a rain garden does, and how all the parts function.



10. Compare a rain garden and a food garden with the students. What plants are best for a rain garden? Different ways to teach this part are below:

a. Show garden plants (beets, kale, carrots, tomatoes) and rain garden plants (sedges, blueberries, sword ferns). Compare the two.

b. Students separate out what goes in a rain garden vs vegetable garden (there may be a crossover!)

c. Rain garden plants can have notes of how much water they like and then students can design their own rain garden using a template to design their vegetable garden using a template with shade (see Thursday afternoon Week 2 printout)

2. Analyze the Week 2 Thursday vegetable garden that they created on the printout for that lesson vs a rain garden diagram.

Adjustments for Age (see activities in the lesson plan above):

K – 1st

- Powerpoint presentation
- Present on vocab words : Watershed, pollution and recycling
- No diagram/map analysis

Rain Garden Engineering

Applied NGSS Science Standards:

Developing a model for the flow of rainwater and using the model to understand how stormwater gets from the sky to the Puget Sound.

Planning and carrying out an investigation of the journey of pollutants from PPP parking lot to the Puget Sound.

Learning Targets: Students can demonstrate, explain how rain gardens catch rainwater. Students can understand the impact of rain gardens on stormwater pollution.
Sub-Learning Target: Students will be identifying various types of pollution found in a parking lot and the impacts of pollution on stormwater and by extension the environment. Students will also model using tennis balls, velcro and gravity to mimic polluted and clean stormwater being entering storm drains and the rain garden.

Content Background: Kent receives a lot of rainfall, but how does Kent manage the stormwater? We will learn about Kent's system to manage stormwater and the impacts and purpose of the rain garden.

Materials:

- 5 Tennis balls
- Velcro
- Visa-V markers
- Chalk (to create fake drains where needed)
- Maps of the stormwater drainage system for Kent
- Two 11x17 maps of the church parking lot before the rain gardens were built

Lesson Prep:

- Gather materials
- Let families know beforehand to be prepared to walk outside.
- Create chalk drains where needed
- Place velcro near a real drain or chalk drain

Activity:

1. Identify types of pollution in the parking lot (rainbow oil from cars, trash, litter, maybe even organic waste) using the garden maps.
2. Analyze drainage slopes, surface area, collection areas before the rain garden (on the hill next to the Hügelkultur bins).
3. Have the students find some pollution around the Paradise Parking Plots until they get to the rain garden.
4. At the rain garden, have the students analyze why the rocks are a part of the rain garden design. Pollution on the rocks is a bonus.

5. After the rain garden, the students can use tennis balls on top of a hill (after the velcro) to find out where water will flow.
    a. Students will hold the balls close to the ground and let go of it. (NOT THROW)
    b. Students and interns will follow the tennis ball to where it ends up (should end up near a drain or a rain garden.)
    c. When picked up, ask how dirty the tennis ball is. Try again if needed.
6. Pollution goes in the drain (the tennis ball will touch the velcro). Gather around an actual stormwater drain or one made with chalk.
    a. When the tennis ball picks up pollution ask students to leave it in the drain and repeat the process until there is a decent amount of pollution is collected
    b. Ask the students why the tennis ball ended up where it did. (ex. They were on a hill).
    c. Ask students what happens when the polluted water after it goes through the storm drain, who it affects, what we can do to stop it.

Supplemental Activities:

- Emphasis on what we can do to stop pollution.
- Why are the rain gardens placed where there are? What size? Will these few rain gardens intercept every drop of rain that falls on this big parking lot? Why is that important? (Maybe show the families the gardens)
- In the familial groups to study the two-sided 11x17 maps of the church parking lot before the rain gardens were built.
- As an end of lesson reflection, have students answer: will rainwater from this parking be cleaner when it slowly seeps downhill underground into Mill Creek? What cleans it?

Adjustments for Age:

5th – 8th

- Focus on diagram analysis.
- Making connections from the stormwater and rain gardens.
- Ask the more specific questions like how the water is cleaned and how it is reused for the sewers.

2nd – 4th

- Focus on the connection between their hands-on activity and the rain garden .

K – 1st

- Let them have fun with the hands-on activity.

Looking Forward/Reflection

Week 5 Objective: Students will be able to recall the content learned throughout summer camp and demonstrate my knowledge in the activities to understand the real world application of the content.

Wrap Up!

Applied NGSS Science Standards:

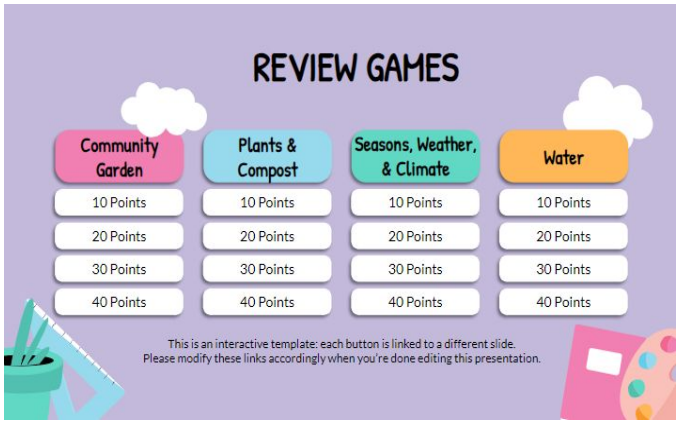
Engaging in argument based on evidence and information from prior lessons.

Learning Target: Students will be able to recall what they learned throughout camp, and demonstrate they know the content as they move on from camp.
Sub-Learning Target: This means by having a reflection in the beginning, plant check, and a jeopardy game.
Content Background: It is now the end of camp, the students should know about topics ranging from seasons to water cycle and photosynthesis.The instructors and students will take some time to reflect on summer camp. Then the rest of class time will be spent on the full review for the content of camp in the form of a fun game. This is also the last time the instructors will be instructing the students on Zoom.
Materials: None for this lesson.

PowerPoint:
Week 5 Tuesday Morning Powerpoint

Activity:

1. Ask an open ended reflection question. After a moment, have everyone share.
    a. What were your favorite things from camp?
    b. What was your favorite concept?
    c. What was your favorite lesson?, etc
2. Plant check!
    a. Check in on how the student's plants did. Ask what worked and didn't work.
    b. Mention the answers to the "At the end of camp" questions on the Sprout Seeds Weekly Growth Chart.
        i. *At this point, the students should know the answers to the "At the end of camp" questions on the Sprout Seeds Weekly Growth Chart.



3. Jeopardy game.
    a. Note: Concepts for the questions will be pooled from the concepts in the "Morning Schedule" and "Afternoon Schedule" on the Google Slides that we presented to the students. It is placed below the lesson plan for convenience.

Supplementary activities:

- Students will take turns playing snowman (hangman but in a different name) in relation to a specific concept (ex. Vegetables, water cycle terms, seasons, etc).
- Fill in the blank. Students will fill in the blank for a sentence.
- Pictionary. The instructor privately messages a student a word, they have to draw it out using Zoom annotate.

Adjustments for age:

K-1st:

- Easier questions

2nd-4th:

- Medium questions

5th-8th:

- Hard questions

Content:

Week 1:

Tues Morn: Material sharing, Where are you from? Where are we now?, Garden Introduction
Tues Aft: Scavenger Hunt [introduction to the garden cistern placement, rain gardens, etc].

Thurs Morn: Discuss Grocery Stores.. Hmm, Discuss, Favorite Dishes.. Yumm, Look Into the Ingredients.. Woah
Thurs Aft: Yet Another.. Dun Dun.. SCAVENGER HUNT !!! But with flags and vegetables!

Week 2:

Tues Morn: Scientific drawing, Soil, What does soil need, Types of soil, Compost, Types of compost
Tues Aft: Play with the different types of soil, Make your own compost- you cannot take it home with you!

Thurs Morn: Weather, Rain in Washington, Water Cycle, What plants need to grow
Thurs Aft: Observe/draw a garden plot, Draw your own garden plot.

Week 3:

Tues Morn: Plant check!, Water cycle review, Seasons, Storyboard Activity, Weather in Kent, Water Movement in Mill Creek, Climate [K-1st, 5-8th]
Tues Aft: Irrigation System Scavenger Hunt, Irrigation System Lab, Exploration and Storytelling

Thurs Morn: Celery Lab, Overwatering/Underwatering, Plant life cycle, Kahoot (5th-8th)
Thurs Aft: Show Celery sticks from Celery Lab in person, Plant observations in a garden plot [which needs the most water?], Pollution, Plant life cycle

Week 4:

Tues Morn: Kahoot [K-4th], Plant Check, Photosynthesis, Climate Change (2-4th), Watershed & Our watershed, My Water. World, Maps
Tues Aft: Watershed lab
Thurs Morn: Water pollution, Healthy vs polluted watershed, Food garden, Pollution solutions, Rain Garden

Thurs Aft: Identify types of pollution, Bioswale drain and flooding, Stormwater drain, Tennis ball activity, Rain gardens as a solution

Twig Boat Creation

Applied NGSS Science Standards:

Developing twig boats and "river" and using the activity to model one way people rely on natural watersheds. Constructing explanations for the most efficient way to engineer a twig boat and designing solutions.

Learning Target: Students will be able to be resourceful and able to recycle what they have. Students will also be able to design, create, and engineer a system using what they have learned throughout the garden.
Sub-Learning Target: Students will be using materials found in the garden to engineer twig boats, to model the journey of a boat in a healthy, clean river versus a polluted river.

Content Background: This will be the last time that the instructors see the students. The lesson plan allows for the students to tie hands-on things together and build something on their own. The obstacle course represents a watershed (a river), the river will have rocks (pollution) that the twig boats are supposed to navigate the "watershed" and get to the lake.

Materials Needed:

- Access to weeds, sticks, flowers
- 1 gardening hose
- 3 Buckets
- 3 Cardboard boxes
- Tarp/ Water resistant paper
- 1 Tin foil roll
- 1 Duct tape roll
- 1 Clear tape/ Scotch tape
- 30 Vegetable Flags
- At least 30 toothpicks

Print Out:
Vegetable Flags

Lesson Prep:
The day before:

- Grab the materials.
- Create vegetable flags.
- Put materials in a pile.

Prior to the lesson:

- If doing the supplementary activities-let the students know to bring their notebooks.
- Build the obstacle course with the tarp (get creative), place pollution in the obstacle course if readily available.

Activity:

1. Before the lesson, take time to set up the obstacle near a water hose.
2. Ask students what they could use around the garden to construct their boat.
3. Have them find things around the garden that they could use, they can collect things in their hand.
4. Time to construct! Give the students approximately 10-15 minutes to construct their twig boat.
5. Give each student a vegetable flag (tape a toothpick and a print out of a vegetable; laminate the vegetable) that they could use to put on their twig boat.
6. Students will then put their twig boats in a line at the beginning of the obstacle course. With a full bucket of water pour it with force at the beginning of the course. Continue pouring water onto the course (preferably with buckets) until the boat(s) has reached the finish line.
7. Set aside some time for reflection questions about summer camp.
    a. What is one thing you learned about from summer camp?
    b. What is one activity or day you liked?, etc.
8. Kids will take home the twig boat as a representation of all they have learned in the garden.

Supplementary activities:

- Possible watershed and water cycle connection
- If there is enough time the students can put rocks/ sticks in the obstacle course to represent pollution. (boats are like fish)
- Have students take out their notebook and sketch what they want their boat to look like.
- Wear fruit/vegetable costumes and have the vegetable flags correspond to the costume. For extra fun, start allegiances corresponding to costumes and vegetable flags.

Adjustments for age:

K-1st:

- These students need more help constructing, assist them as needed.

2nd-4th:

- Use tape sparingly, encourage natural ways of tying things together.

5th-8th:

- Have these students design before constructing.
- Connect the lesson plan with more concepts.

Content:

- Scientific Drawing (designing twig boat)
- Engineering (creating twig boat)
- Pollution solutions (reusing what is naturally available)
- Observation (what they could see around the garden to use)
- Vegetable knowledge (vegetable flags and suppl: vegetable costumes)

Resources

Resources

Original Lesson Plans
Powerpoint Presentations
World Relief Seattle Summer Camp Youth Website
School Gardens Lesson Plans by Whole Kids Foundation and American Heart Association
Link to children's composting books

Eight Practices of Science and Engineering:

NGSS Science and Engineering Practices

Learn more about NGSS:

Next Genscience

NGSS Video (0-0:27)

Exploring NGSS in the Classroom 1

Exploring NGSS in the Classroom 2