5th Grade Curriculum

Platform: Wetlands

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5th Grade Curriculum Overview

Guiding Concept: Students will study why wetlands are important; how the biosphere, geosphere, and hydrosphere interact within this environment; and how we can protect wetlands in the future.

Science Discovery Process Focus:

- Make a Difference
- Explore and Wonder
- Investigate & Analyze

Ocean Discovery Unit

Next Generation Science Standards:

Cross Cutting Concept:
Systems and systems models – students understand that a system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. They can also describe a system in terms of its components and their interactions.

NGSS Alignment

5th Grade Story

Internal – Staff and Teachers

Students learn the importance of wetland habitat and how they can help protect it. Content will focus on how the biosphere, atmosphere, geosphere, and hydrosphere interact within this environment.

During the Community Building Day students are introduced to the wetland ecosystem and the plants and animals that live there through a search and find activity. They create a Discovery Bracelet to build belief that they are a unique individual who belongs to a community of scientists.

During the Exploration Day at Sweetwater Marsh, students investigate a real wetland and use scientific tools to analyze how plants, animals, and humans utilize this habitat while building their belief that they can recognize and do science.

During the Make a Difference Day at the Living Lab, students learn how they can help protect wetlands while investigating a wetland in their own neighborhood. Students make a difference today by planting seedlings to zipline into the canyon for future restoration projects and make a difference tomorrow by becoming engineers and designing machines to clean up future wetlands. Students also meet a scientist who shares their career pathway and challenges and obstacles they have faced along the way to becoming a science leader. Collectively, these experiences build students' belief that science is important and relevant, that a career in science is a possibility, challenges can be opportunities to learn and grow, and that they can make a difference in the world.

Students love becoming engineers, exploring the wetlands, using scientific tools, getting to know science leaders, and making a difference in the world!

Overarching Responsibilities of Lead Instructors:

- Classroom management & timing of lesson.
- Execution of all lesson material in this curriculum.
  - *Italics* – utilize the exact language when teaching
  - Regular – content that should be covered using language of your choice
  - (Parenthesis) – Teaching notes and actions
- Lead discussions & ask guiding questions to get students thinking about science.
- Use Belief and Science Discovery Process exploration language during lesson.
- Provide rules for activities.
- Encourage participation from all students to create an inclusive environment.
- Determine floor management with team BEFORE the start of the lesson.

Overarching Responsibilities of Assistant Instructors:

- During lead instructor's introduction and closing:
  - Prep supplies quickly then join the class.
  - Participate in any kinesthetic movements.
  - Sit with students and model good listening behavior.
  - Sit or stand near any students struggling to pay attention.
- During hands-on portion:
  - Mentor students in your floor area by asking questions, providing guidance, and providing positive reinforcement.
  - Engage students who are struggling.

5th Grade Story

External – Students

I am excited to continue my journey with Ocean Discovery Institute in 5th grade by learning more about the wetlands I started to explore in 2nd grade. Over the years, Ocean Discovery has helped me believe that science is something I can do, and a scientist is someone I can be.

On our first day, I meet the Ocean Discovery staff when they come to our classroom. We build bracelets that show we are all scientists and also unique individuals because everyone's bracelet is a little different. We learn about how the biosphere – the living things, like plants and animals – interact with the non-living parts of the wetland, like the atmosphere, geosphere, and hydrosphere. It's pretty cool that I am building on my knowledge of wetlands and learning all this scientific vocabulary!

I am so excited when we get to visit the Sweetwater Marsh and explore a real wetland! We see so many plants and animals and spend the whole day investigating how the different spheres interact with each other. We even get to help out this special place by picking up trash and planting a plant to help combat the harm that humans sometimes do in places like this.

On our last day, we go to the Living Lab to learn how we can use all our knowledge to make a difference. We get to see a robot that scientists have created to clean up garbage in the ocean and then become engineers ourselves and design a robot to help clean up the wetlands. Our team's robot is awesome! During one of my favorite parts of the day we get to become restoration biologists – those are scientists who help to restore the wetlands. We plant seeds that will grow into seedlings and will be planted in the canyon in the future. The best part? We use a zipline to transport the seeds down to the canyon! I like making a difference in my neighborhood. We get to meet a science leader who tells us about how they got to be a scientist and lets us ask questions about their job. They even talk about times they felt challenged and how they got through it – who knew that scientists can sometimes face obstacles like me? It gets me thinking that I might want to be a scientist someday.

I can't wait to be a part of Ocean Discovery in 6th grade!

Community Building Day

In-School Experience

Goal: Students establish belief that they are a unique individual contributing to a community of science.

Supplies:

- All found: \\vmfile01.aquatic.com\Master Files\Curriculum\SI New\Upper Elementary (3-5)\5th Grade\Community Building Day Visuals
    - 5th Grade Community Building Day PowerPoint **-OR-**
        - Community Agreements poster (1)
        - Wetland Poster (1)
        - Wetland Video (1)
    - Wetland Bingo Cards (1)
    - Wetland Search and Find Drawing (laminated) (1/student)
    - 5th Grade Bracelet Questions (1)
- Science Discovery Process poster w/ Velcro pieces
    - \\vmfile01.aquatic.com\Master Files\Curriculum\SI New
- Dry erase markers thin-tip (1/student)
- Dry erase board cleaning fluid (1/bottle)
- Rag (for cleaning Search and Find Drawings) (2)
- Chart paper (1)
- Sharpies (3)
- White pipe cleaners for bracelets (1 per student)
- Beads
    - 4 colors, 6 bowls per color with enough beads for multiple classes

Timing:

Time	Activity	Learning Cycle
0:00–0:15	Introductions & Discovery Bracelets Intro	Engagement
0:15-0:25	Wetland Intro	Exploration
0:25-0:40	Search and Find - Wetlands	Guided Analysis
0:40-0:50	Finish Discovery Bracelets	
0:50–1:00	Reflection	Reflection

Instructor Notes:

- € Introduce yourself and staff to teacher
- € **Collect waivers from teacher**
- € Ask teacher if they would prefer you to write on board or chart paper.
- € Determine if there is floor space for students to sit during into and self-reflection, if not:
  - o Students can do intro and self-reflection at their desks/tables.
  - o Pair up students sitting next to each other for self-reflection.
- € Invite teacher to participate throughout and explain when you and staff will need their help during the lesson:
  - o Help students with bracelet making, organize students for self-reflection, etc.
- € Discuss floor management plan with other staff.
- € Use attention getters whenever necessary. (i.e. transitioning from activity to activity, when giving a set of directions, when bringing the class together to share out, etc.).

Assistant Instructor Set Up:

- € Cue up 5th Grade Community Building Day PowerPoint from teacher portal -OR- bring all visuals to front of classroom:
  - o Community Agreements Poster
  - o Wetland Poster
  - o Wetland Video
  - o Science Discovery Process Poster
- € Check that external video sources are enabled to play the video of the Wetlands (both PowerPoint or directly from YouTube).
- € Set up chart paper and sharpies at front of room where whole class can see (if using chart paper).
  - o Write the word "Wetlands" on the board/chart paper.
- € Prep bracelet supplies in the back of the room:
  - o Open all bead containers and stack in groups for each table
  - o Count out pipe cleaners

Assistant Instructor Teaching Notes:

- € During Lead instructor's introduction:
  - o Prep supplies quickly then join the class
- € Help move students to the floor or circle (if there is space).
- € After Community Agreements quietly place beads and pipe cleaners at the center of each table.
- € During Discovery Bracelet making, you have a Mentoring opportunity. Potential questions include:
  - o Why did you choose that answer?
  - o Would you ever consider doing the other one (the choice they didn't choose)?
  - o Tell me why you enjoy that more?

Introductions & Discovery Bracelets
Introductions and Community Agreements (5 min)
Discovery Bracelets (10 min)

Introductions:

- (Have students sit together or if there is no room students can stay at their desks/tables for introduction.)
- All staff take 30 seconds to introduce themselves and share their story.
    - (Details for your story can be found in **SI Education Guide**)
- Introduce Ocean Discovery Institute.
    - Give a very brief overview of the program (3 days, 1 class visit, 1 exploration day, etc.).
- Introduce the concept of being a scientist with Ocean Discovery Institute:
    - Some students have had Ocean Discovery since Kindergarten and for some students it's their first year.
    - When you work with Ocean Discovery – you are a scientist.

Community Agreements:

- As scientists we all must agree to follow a certain set of expectations when we work together.
- At Ocean Discovery we believe everyone should Be Their Best Self.
    - (Show Community Agreements slide.)
- **To Be Your Best Self**, you should:
    - **Be curious!**
        - Ask questions, make observations, and share your thoughts and ideas.
    - **Be respectful!**
        - Respect people, living things, and the environment around you.
    - **Be safe!**
        - Take care of yourself and others.
- Ask students to give a thumbs up or a verbal "yes" if they can agree to be their best self when working with Ocean Discovery.

Discovery Bracelets

Intro:

- Throughout class today, you will be making a Discovery Bracelet that represents YOU as a scientist.
- To make a bracelet you will answer a series of question about yourself, depending on your answer you will place a bead of a certain color on your bracelet.
    - For example, the question is: "Would you rather, climb the tallest mountain on Earth /or/ dive to the bottom of the ocean?" If you would rather climb the tallest mountain, you will put an orange bead on your bracelet (demonstrate) and if you would rather dive to the bottom of the ocean, you will place a dark blue bead on your bracelet.
    - Once you've placed your bead on your bracelet you can talk to the person next to you and tell them which bead you chose and why you chose it, and you can ask them about which bead they chose and why.
- (Have each student pick up a pipe cleaner.)

- (Repeat the question and ask students to choose an orange or dark blue bead and place it on their pipe cleaner.)

Create bracelets:

- Ask 2-3 more questions:
  - Would you rather have super strength like an ant /or/ super vision like a hawk?
  - Would you rather study the properties of water in the ocean /or/ the properties of soil that make up the Earth?
  - Would you rather go swimming in the ocean /or/ hiking in a forest?
- (Have students hold bracelets up and show each other.)

Discovery Bracelet Debrief:

- (Have students hold bracelets up and show each other.)
- Focus on uniqueness and belonging.
  - At Ocean Discovery Institute we believe that all students are unique individuals who belong to a community of science leaders.
  - Belonging:
    - Each of you has a bracelet because you are a science leader and therefore you belong to a community of science leaders.
  - Uniqueness:
    - But each of you is unique.
      - Define unique: being the only one of its kind.
    - Each of you is, one of a kind, so each bracelet is also one of kind, because everyone has different interests and picked different answers to the questions.
  - One of the greatest assets to the science leader community is having lots of unique people with many different interests and ideas.
- We will return to building our bracelets later.
- Now we will learn about the habitat we will be exploring together this year and the many unique organisms that live there.
- (Have students put lids on bead containers.)

Wetland Intro

Introduce Science Discovery Process:

- When you work with Ocean Discovery – you are a scientist.
  - Ask: What are some things you think scientists do?
- Scientists do many things – all of them are included in the Science Discovery Process.
  - (Show Science Discovery Process poster.)
  - This is the process scientists use to do science!
- Go through each part of the Science Discovery Process provide a brief explanation.
  - Make a Difference: Scientists often want to make the world a better place and help people.

- Explore and Wonder: They are always wondering about the world around them and how it works. Scientists ask lots of questions, make observations, and take time to explore. They can do this using any of their senses like seeing, hearing, touching, tasting and smelling.
- Investigate: Scientists design experiments and gather evidence based on their observations.
- Analyze: Once scientists have gathered lots of evidence, they look for patterns and try to come up with explanations for their questions.
- Communicate: Scientists know it is really important to share the things they learn with other people so they can learn too.
- Make a Difference: Once scientists have learned something new it often leads them to other questions and ideas about how to make the world a better place, so the cycle continues again and again and again! Scientists are always working in some part of the Science Discovery Process!

Introduce Wetlands:

- Today we will be exploring a special ecosystem here in San Diego called the wetlands.
- Uncover prior knowledge:
  - Has anyone ever visited a wetland before?
  - What is it like there?
  - Where do we find wetlands?

2nd Grade vs. 5th Grade

Starting in 24-25 school year, students will have learned about the wetlands with Ocean Discovery in 2nd grade.

- Remind students who worked with Ocean Discovery in the past, that they explored the wetlands in 2nd grade. Remind them of their trip to the Living Coast Discovery Center.
- This year we will learn even more about the wetlands.

Potential Questions:

- *Does anyone remember exploring the wetlands with Ocean Discovery in 2nd grade?*
- *Does anyone remember what the wetlands are like?*
- *Does anyone remember what kinds of plants and animals are found in a wetland?*

- Okay scientists! It is time to **Explore and Wonder**!
  - *o* (Point to Science Discovery Process poster.)
- Define Wetland:
  - (Use the board/chart paper.)
  - Definition of a wetland: where water and land meet, wet-land
  - This year we will dive further into the wetlands – investigating how the living parts of the wetlands -plants and animals interact with the non-living parts of the wetlands.
- Let's see what it's like at the wetlands!
  - (Play Wetlands video/poster.)
  - (Show Wetlands slide/poster.)
  - Have students look at the Wetlands slide/poster and ask:

- What questions do you have about the wetlands? What do you wonder?
- What do you notice?

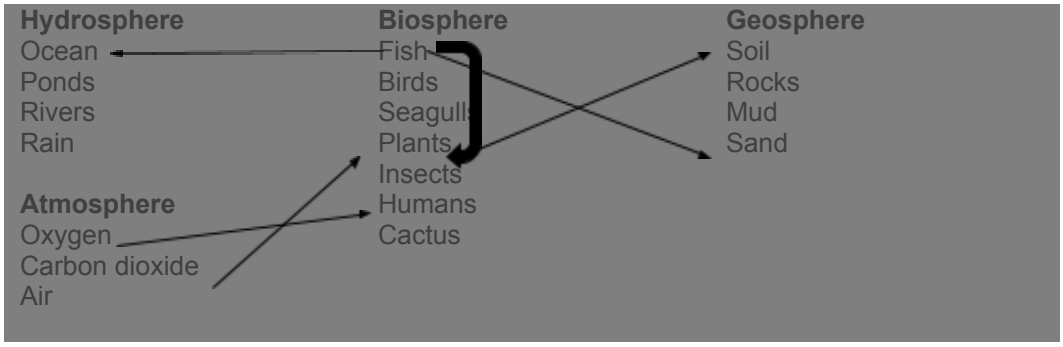
<u>Introduce Spheres</u>

- There are so many things that are part of a wetland!
  - As science leaders it can be helpful to group things together according to shared characteristics.
  - One way we can group things in the wetland is by "sphere".
- Introduce Biosphere.
  - Bio = life
    - Biologist- scientist who studies life
  - Biosphere = all the living things on Earth
    - Ask students to name things they think belong to the biosphere.
    - Examples: Plants and animals
      - Record these in a chart (example below).
  - Introduce hand motion to remember biosphere.
    - Pointing at self with thumbs because we are living things and are part of the biosphere too.
- Introduce Geosphere.
  - Geo = earth or land
    - Geologist – scientist who studies the earth and land
  - Geosphere = all the rocks and minerals on Earth
    - Ask students to name things they think belong to the geosphere.
    - Examples: soils, rocks, minerals, lava, etc.
  - Introduce hand motion:
    - Clasp hands together like a rock
- Introduce Hydrosphere.
  - Hydro = water
    - Hydrologist – scientist who studies water
  - Hydrosphere = all the water on Earth
    - Ask students to name things they think belong to the hydrosphere.
    - Examples: oceans, lakes, streams, rain, clouds, ice, etc.
  - Introduce hand motion:
    - Put hands together and move arms up and down like a wave
- Introduce Atmosphere.
  - Atmos = air
  - Atmosphere = all the air (gases) that surround the Earth
  - Meteorologist – scientist who studies the atmosphere
    - Ask students to name things they think belong to the atmosphere.
    - Examples: all the gases surrounding the earth (oxygen, carbon dioxide, hydrogen, etc.)
  - Introduce hand motion:
    - Move arms in air like the wind
- All the different spheres interact with one another.
  - Example:

- Draw an arrow from fish to ocean and say, “Fish use the water from the hydrosphere to breathe/swim/find food, etc.).
- Draw an arrow from fish to sand and say, “Some fish like to hide in the sand of the geosphere to avoid being eaten.”
- Draw an arrow from fish to plants and say, “Some fish like to eat plants from the biosphere.”
- Draw an arrow from plants to carbon dioxide and say “Plants need carbon dioxide from the atmosphere to grow.”
- Etc.

o Ask students to make some “sphere” connections and record them on the chart.

- Example of how chart could look:



Search & Find – Wetlands

Assistant Instructor Teaching Notes:

- Help pass out Wetland Search and Find Drawings and a dry erase marker to each student.
- During the activity help students who are struggling to find the things they are looking for.
- When activity is done collect and clean Search and Find Drawings using cleaner and rags.

Introduce Search and Find Drawing

- Okay Science Leaders, now that we know a little about the wetlands and the different spheres let’s take some time to explore!
  - We are going to explore a drawing of a wetland today and in a few days, you will explore a real wetland with Ocean Discovery.
- (Pass out Wetland Search and Find Drawings).
  - Give a minute for a “wow moment” and allow students to explore it.
- Orient students to the Wetland drawing.
  - (Show Wetland Drawing slide.)
  - Point out the waterline and what is above and below the water.
- Ask students to make observations about the wetlands.
  - Write their observations down on a piece of chart paper.
  - Scientists often write down or draw their ideas, observations, and questions so they can investigate them later.

Introduce Bingo

- (Project one Wetland Bingo Card slide.)
    - Review some words students may be unfamiliar with (invertebrate, carnivore, herbivore, etc.)
- Goal is to create a bingo (vertical, horizontal, diagonal, etc.) using things they see on their search and find drawing.
    - They can use the dry erase markers to mark or circle things on their Search and Find pictures.
- Set a timer.
    - When time is up, ask students to raise their hand if they found a bingo.
    - Ask 2-3 students to share the items from their search and find drawing they used to create a bingo.
    - If time allows repeat the process using a different bingo card.
- (Collect Wetland Search and Find drawings.)

Finish Discovery Bracelets

Assistant Instructor Teaching Notes:

- Talk to students about their answer choices to "Would You Rather" questions. Potential questions include:
    - Why did you choose that answer?
    - What do you like more about….?
    - What do you think that would be like?
- Help students finish Discovery bracelets and put them on.

- Have students pick up bracelets again.
- Ask as many questions as time allows:
    - As a wetland biologist, would you rather investigate plants and animals on the land /or/ plants and animals in the water?
    - As a wetland biologist, would you rather explore larger wetland animals using binoculars /or/ smaller wetland animals using a hand lens?
    - As a wetland biologist, would you rather study birds in the air /or/ study sharks in the water?
    - As a scientist, would you rather draw your ideas with pen and paper /or/ build your ideas with tools?
    - As a scientist with Ocean Discovery, are you more excited to talk to real scientists /or/ more excited to learn how to protect the wetlands?
    - As a scientist, would you rather study cures for diseases that make people sick /or/ study what can protect us from climate change?
    - To learn about the animals that live in the water of the wetlands, would you rather design and build your own special research boat /or/ design and build an underwater robot to take data for you?
- We are all scientists working with Ocean Discovery so let's all put one blue bead as the last bead on our bracelet.
    - (Have every student put a final dark blue bead on their bracelet.)

- Show students how to put on bracelet and have them help their partner.

Self-Reflection

Reflection:

- Introduce why we do reflection:
  - Reflection is a part of every Ocean Discovery Institute experience.
  - Reflection gives you time to think about what you experienced and learned today and how it fits into the things you already know.
  - Reflection can highlight ways your thoughts, ideas, and feelings change over time as you learn and experience new things.
- Reflect on bracelets:
  - For example, let's reflect on our bracelets. Some people might simply think they are simply pretty bracelets but we know they mean more than that.
  - Belonging.
    - Everyone has a bracelet and everyone's bracelet has a dark blue bead at the end of the bracelet = belonging to a community of science leaders.
  - Uniqueness.
    - Point out that everyone's bracelet has different color beads in a different order = each of you is a unique person with your own thoughts and ideas.
  - Diversity.
    - Having many unique people in the community of science leaders is great because it creates diversity in science.
    - Just like having a diversity of animals makes a healthy ecosystem, having a diversity of people in science makes a healthier science community too.
    - More diversity in science means more ideas about how to make a difference and that's makes a healthier planet for everyone.
- Think-Pair-Share Reflection:
  - (See Think-Pair-Share protocol below if unfamiliar.)
  - Everyone's reflection experience is unique because we are all different people but as member of the science leader community it is important to share and listen to other people's reflections so we can hear new ideas and learn new perspectives.
  - We will do a think-pair-share to reflect on our own experiences and to hear from others.
  - Think-Pair-Share questions:
    - (Show Reflection Questions slide.)
    - How does it feel to be a member of a community of science leaders?
    - Why do you think it's important for the community of science leaders to be diverse?

Closing

- (Show Go Awesome slide.)
- Remind students that they are now a member of a community of scientists and that they will visit a wetland with Ocean Discovery to continue exploring investigating on ____ date.
  - **REMINDER TO STUDENTS**: Do not bring personal backpacks on Ocean Discovery Field Trip. We will provide a backpack full of scientific tools for you to use that day.
- Thank you for doing science with us today!

- You have learned about some of the different plants and animals that live in the wetlands and how the different parts of the bio-, geo-, hydro-, and atmosphere interact.
- Please share your Discovery Bracelet and everything you learned about the wetlands with your friends and families tonight.
- Thank you for being your best self today scientists!
- At Ocean Discovery Institute we **BELIEVE** that science is something you can do and a scientist is someone you can be, that you can **ACHIEVE** in science and think critically about our world, and you can **LEAD** in science and conservation and make a difference in the world. Because we believe this, we do a "Believe! Achieve! Lead! Go Awesome!" cheer at the end of every program so that you will continue to do awesome things after we leave.
- On the count of three we will yell "Believe! Achieve! Lead! Go Awesome!"

Think-Pair-Share Protocol:

- *Read a question out loud.*
- *Give 20-30 seconds of silent think time.*
- *Choose one student to share their response first - give that student 30 seconds to share.*
  - *Remind students that when you are sharing with a partner it is important to both share and listen carefully.*
  - *Remind students that when it is their turn to listen they should use body language that tells the other person they are listening. Not talking over them, making eye contact, nodding, asking questions, etc.*
- *Bring attention back to instructor.*
- *Allow second student in pair 20-30 seconds to share their responses.*
- *If time allows choose 1-3 students to share their response or their partner's response with the group.*
- *Repeat with different questions as often as time allows.*

WETLAND BINGO CARDS

Something from the biosphere	A bird	A plant or animal you do not recognize
An animal that can swim	Something from the hydrosphere	An animal that hunts in the water
An animal that hunts on land	Something from the geosphere	An animal with claws

An animal without a backbone	An animal who is a predator	Something from the hydrosphere
A plant	Something from the biosphere	An animal that can hunt in the water
Something from the geosphere	A plant or animal you recognize	An animal that is prey

An animal that eats plants	Something from the biosphere	Something that lives underwater
Something from the geosphere	A fish	A bird that uses its beak to find food in the mud/sand
A plant that lives in the water	An animal with a backbone	Something from the hydrosphere

Exploration Day

Coastal Field Experience

Goal: Students build belief that they can recognize and do science while investigating how the different spheres (atmosphere, hydrosphere, geosphere and biosphere) interact at Sweetwater Marsh.

Supplies:

- Ocean Discovery Institute Field Trip Volunteer Card print out (1/adult volunteer)
- Cover sheet (1/class)
- Bandanas (small – they will be tied onto wrists) (1/student + 1/adult)
    - 4 colors (1 color/group)
- Water jug (1)
- Cooler w/ ice packs (1)
    - For staff lunches
- Explorer Backpacks (1/student)
    - Binoculars
    - Hand lens
    - Wetland Plant and Animal ID card
    - Wetland Trail Map
    - Clipboard
    - Work Gloves (for picking up trash)
- Team Lead backpacks (1/Team Lead)
    - Transect tape (1)
    - Bottle of hand sanitizer (1)
    - First Aid Kit (1)
    - White Board + Marker + Eraser (1/1/1)
    - Post Its (1)
    - Rubber bands (10)
    - ½ sheet of blank paper (1/student + 1/adult)
    - Laminated Emergency Protocol & Phone Numbers (1)
    - Incident Report Sheets (12)
- Assistant Team Lead Backpack (1/Assistant Team Lead)
    - Trash bags (4)
    - Bottle of Hand Sanitizer (1)
    - Science notebook (1/student)
    - Pencils (1/student + 5 extra)
    - Pencil Sharpener (1)
    - Wet Bag (1)
    - Extra Work Gloves (2)
    - Bug Spray
- Manila folder (1/class)
    - To store student science notebooks to be returned on Living Lab day
- General Bin – to be stocked with extra materials for backpacks (1)
    - Extra bandanas
    - Extra binoculars
    - Extra hand lenses

  - Extra Wetland Plant and Animal ID Cards
  - Extra Trail Map (USFWS)
  - Extra Pencils
  - Extra Science Notebooks
  - Extra Clipboards
  - Extra Work gloves
  - Extra trash bags
  - Extra bottles of hand sanitizer
  - Extra ½ sheets of blank paper
  - For Alternate Humans in the Wetlands Activity
    - Rare Pokémon Card Worksheet (60)
    - Example Rare Pokémon Card (2)
    - Endangered Species of the Wetlands Biographies (laminated) (6 sets)
    - Pencils (30)
    - Assorted Crayons
- Tarps (2)
- Sweetwater Marsh in 2018 poster (1)
- Laminated Trail map (1/group)
- Materials Provided by USFWS
  - Soil
  - Shovels (2)
  - Buckets (1/pair of students)
  - Plants (1/pair of students)
  - Watering cans or tub

5th Grade Explore Timing – USFWS San Diego Bay Wildlife Refuge

*Station times include walking time (be sure to leave 5-7 minutes to walk between stations)

2 class rotation:

Time	Group 1	Group 2
9:45 – 9:55AM	Arrival	
9:55 – 10:15AM	Introduction ***Pollinator Garden***	Introduction ***USFWS Breezeway***
10:15 – 10:55AM	Humans in the Wetlands: ***Trash Area 1***	Plants in the Wetlands ***Restoration Station***
10:55 -11:25AM	Lunch ***USFWS Breezeway***	
11:25 – 12:05PM	Plants in the Wetlands ***Restoration Station***	Animals in the Wetlands: ***Trail Walk then Bird blind***
12:05 – 12:45PM	Animals in the Wetlands: ***Trail Walk then Bird Blind***	Humans in the Wetlands: ***Trash Area 1***
12:45 – 1:05PM	Self-Reflection ***USFWS Breezeway***	Self-Reflection ***Pollinator Garden***
1:05 – 1:15PM	Clean up + Goodbye + Load Buses	

5th Grade Explore Timing – USFWS San Diego Bay Wildlife Refuge

*Station times include walking time (be sure to leave 5-7 minutes to walk between stations)

3 class rotation:

Time	Group 1	Group 2	Time	Group 3
9:45 – 9:55AM	Arrival		**9:45 – 9:55AM**	Arrival
9:55 – 10:15AM	Introduction ***USFWS Breezeway***	Introduction ***Restoration Station***	**9:55 – 10:15AM**	Introduction ***Pollinator Garden***
10:15 – 10:55AM	Animals in the Wetlands: ***Trail Walk then Bird Blind***	Plants in the Wetlands ***Restoration Station***	**10:15 – 10:55AM**	Humans in the Wetlands: ***Trash Area 2***
10:55 – 11:35AM	Humans in the Wetlands: ***Trash Area 2***	Animals in the Wetlands: ***Bird Blind then Trail Walk***	**10:55 – 11:25AM**	Lunch ***USFWS Breezeway***
11:35 – 12:05PM	Lunch ***USFWS Breezeway***		**11:25 – 12:05PM**	Plants in the Wetlands ***Restoration Station***
12:05 – 12:45PM	Plants in the Wetlands ***Restoration Station***	Humans in the Wetlands: ***Trash Area 2***	**12:05 – 12:45PM**	Animals in the Wetlands: ***Trail Walk then Brid Blind***
12:45 – 1:05PM	Self-Reflection ***Restoration Station***	Self-Reflection ***USFWS Breezeway***	**12:45 – 1:05PM**	Self-Reflection ***Pollinator Garden***
1:05 – 1:15PM	Clean up + Goodbye + Load Buses		**1:05 – 1:15PM**	Clean up + Goodbye + Load Buses

With 4 classes:

Time	Group 1	Group 2	Group 3	Group 4
9:45 – 9:55AM	Arrival			
9:55 – 10:15AM	Introduction ***Restoration Station***	Introduction ***Pollinator Garden***	Introduction ***USFWS Breezeway***	Introduction **Overlook**
10:15 – 10:45AM	Plants in the Wetlands ***Restoration Station***	You in the Wetlands ***Sit Spot/Sound Map***	Animals in the Wetlands: ***Trail Walk then Bird Blind***	Humans in the Wetlands: ***Trash Area 1***
10:45 – 11:15AM	You in the Wetlands ***Sit Spot/Sound Map***	Plants in the Wetlands ***Restoration Station***	Humans in the Wetlands: ***Trash Area 1***	Animals in the Wetlands: ***Bird Blind then Trail Walk***
11:15 – 11:45AM	Lunch ***USFWS Breezeway***		You in the Wetlands ***Sit Spot/Sound Map***	Plants in the Wetlands ***Restoration Station***
11:45 – 12:15PM	Humans in the Wetlands: ***Trash Area 1***	Animals in the Wetlands: ***Trail Walk then Bird Blind***	Lunch ***USFWS Breezeway***	
12:15 – 12:45PM	Animals in the Wetlands: ***Bird Blind then Trail Walk***	Humans in the Wetlands: ***Trash Area 1***	Plants in the Wetlands ***Restoration Station***	You in the Wetlands ***Sit Spot/Sound Map***
12:45 – 1:05PM	Self-Reflection ***Pollinator Garden***	Self-Reflection ***Bird Blinds***	Self-Reflection ***Restoration Station***	Self-Reflection ***USFWS Breezeway***
1:05 – 1:15PM	Clean up + Goodbye + Load Buses			

5th Grade Explore Site Map



Pre-Trip:

- Take clean work gloves from dryer of Living Lab to be placed into Explorer backpacks (1/student).

Arrival

Program Set Up:

- Breezeway:
  - Set up water jug for refills.
    - Fill water jug at USFWS with classroom sink.
  - Set general bin in an accessible location for all staff.
  - Distribute instructor backpacks.
  - Divide bathroom keys between staff.
- Group meeting areas:
  - Place a clean pair of work gloves in each backpack.
  - Fill water bottles in sink (5 per group as more students bring personal bottles now)
- Introduction stations:
  - Distribute bandanas (1/student+ 1/adult)
  - Distribute explorer backpacks (1/student)
    - Try to pull a consecutive grouping of backpack numbers (e.g., #'s 1-15) for each group. This will make it easier at the end of the trip to separate backpacks that need to be restocked vs. those that don't.
- Restoration:
  - Set up two tarps or USFWS buckets in circles for sitting.
  - Place two USFWS shovels in fresh soil pile.
  - Ensure plants for the day are ready and accessible.
  - Fill USFW water cans with hose or water tub.
- Humans in the Wetlands (Alternate Activity)
  - *Only to be set-up if the Trip Lead determines it is too hot outside for trash pick-up.
  - Make sure classroom is open and set up for a group to sit down and work on Most Wanted posters (see curriculum below).

- Trip Lead:
  - Determine if the weather is too hot and substitute activities should take place (see below)
    - Confirm USFWS classroom is available.
    - Communicate changes to staff.
    - Substitute/modified activities:
      - Animals in the Wetlands:
        - Trail walk = take shortest path to/from birds and do an extended sit spot/sound map(see curriculum).
        - Spend more time in the shade of the bird blind.
      - Humans in the Wetlands:
        - Go to USFWS Classroom and do
  - Meet buses at Living Coast Discovery Center.
    - Introduce yourself to teachers and bus driver.
    - Explain to bus driver how to get to US Fish and Wildlife Service.

- On the road to USFWS, introduce yourself to students and:
  - Welcome students to Sweet Water Marsh.
  - Invite students to start making observations of geosphere, atmosphere, hydrosphere and biosphere.

- Begin Arrival Tasks.
  - ***o*** *Note: The below should take place simultaneously.*
  - Trip Lead (1)
    - Upon arriving at USFWS building:
      - Dismiss all chaperones on the bus to meet with the instructor doing the **Chaperone Introduction**.
      - Take teachers off buses and have them note any students absent on the roster and sign a cover sheet stating they've collected all waivers to the best of their ability.
      - Unload students by class and send to their instructor.

  - Assistant Team Leads (2)
    - Help the bus driver unload the lunches.
    - Place lunches in front of each bus so that one lunch can be handed to each student as they disembark.
    - Each assistant instructor should stand outside one bus to pass out lunches to students.

  - **o** Team Lead (1)
    - Take adult chaperones aside and discuss expectations for the day.
    - Provide each one with an "Ocean Discovery Institute Field Trip Volunteer Card" and explain how they can be most helpful today:
      - No cell phones unless snapping a quick picture.
      - Interact with the students. Ask them questions. Don't be worried if you don't know the answers to things, that is okay!
        - **o** On your card there is a short list of some questions you can ask students.
      - Participate with the group. Sit in the circle with the students. Do dances, answer questions, be a partner with a student during pair-shares.
      - Please no side conversations while the instructor is talking.
      - Have fun!

  - **o** Team Leads & Assistant Team Leads
    - Meet students in their group as they get off the bus.
    -

Introduction

Assistant Instructor Teaching Notes:

- Help distribute Explorer backpacks & bandanas (1 color/group)
  - Help students place their lunch in their Explorer backpack.
  - Wear a bandana! Students love to do what you do!
- Sit with students during introduction.
- One of the goals of the day is for students to feel that they are **doing science**. Potential questions to ask throughout the day include:
  - How are you using science to look at this?
  - What are you wondering about?
  - What tool(s) are you using to help you explore?
  - What have you written in your scientific notebook?

Staff and Volunteer Intros:

- Staff and volunteer introductions:
  - All staff + volunteers take 30 seconds to introduce themselves and share their story.

Welcome student to Sweet Water Marsh:

- We are next to San Diego Bay.
- Sweetwater Marsh is a protected wetland.
  - Explain to students that we will practice – Leave no Trace. We leave nothing behind but footprints and trash.
  - Because it is a protected area we cannot take anything home with us including rocks, shells, etc.
  - Review the definition of a wetland – where land and water meet.
- In 2nd grade we visited the Living Coast Discovery Center (point) and explored how the biosphere- plants and animals used the wetlands as wildlife housing.
  - (Show wildlife housing movement.)
- Today as 5th graders we will explore the Sweetwater Marsh wetlands and **Investigate how the biosphere interacts with the other spheres.**

Review Spheres:

- Review, through questions, definition, examples, and hand motions for:
  - Atmosphere
  - Geosphere
  - Hydrosphere
  - Biosphere

Preview the Day's Theme:

- Today we will explore a real wetland.
- Our focus will be on making observations and asking questions about how plants, animals, and humans interact with the different spheres here in the wetlands.

- You will visit three different stations. One station will focus on plants, one will focus on birds, and one on humans; however, as we work today and walk from station to station, don't hesitate to make observations about anything in the wetlands.

Introduce Science Notebooks and Explorer Backpacks:

- To make observations, scientists need tools and a place to write their observations and ideas.
- Each backpack has a science notebook.
    - Scientists use notebooks for recording things they see, and questions and thoughts they have.
    - Can be used anywhere- in the lab, in the field, at home.
    - You can write, draw, or sketch in your science notebook at any time today.
    - At the end of this program your science notebook will be yours to take home.
- Each backpack has tools for investigation.
    - You may use any tool at any point today to make observations about the rocky seashore.
    - Treat all tools respectful and be sure you return them to your backpack when you are finished using them.
    - You are responsible for your backpack all day.
- (Give students time to look through backpack.)

Lunches & Personal Backpacks:

- If students brought their own backpacks, they need to place their backpack inside their Explorer Backpack.
- Have all students place their lunch in their Explorer backpack.
- Distribute a water bottle to any student who needs one.

Introduce Bandanas:

- Scientists work as a team. Even though we are unique individuals with our own thoughts, ideas, and questions, we must be able to work as a team.
- Look around you- these are your fellow scientists.
- We all have the same color bandana to signify our unity as a team.
- Adults have bandanas as well because they are also part of the scientific team. Feel free to ask any adult questions throughout the day!
- (Pass out bandanas to students and adults.)

Introduce Team Name:

- Tell students their team name.
- Explain that the team name is an attention getting signal.
- Example:
    - When you here "Blue!"
    - You all shout "Egrets!"
    - (Practice call and response a few times.)

Review Community Agreements:

- Working as a team of scientists and we all must agree to follow a certain set of expectations.

- At Ocean Discovery we believe everyone should Be Their Best Self.
    - (Show Community Agreements slide.)
- To Be Your Best Self, you should:
    - **Be curious!**
        - Ask questions, make observations, and share your thoughts and ideas.
    - **Be respectful!**
        - Touch animals gently. If something does not come up with a gentle tug leave it and observe it in its habitat. If you find a small organism that is easily moved you may place it in your petri dish but be sure to return it to its home after a couple of minutes.
    - **Be safe!**
        - Take care of yourself and others. Walk everywhere and stay within the boundaries.
- Ask students to give a silent thumbs up if they can agree to be their best self when working with Ocean Discovery.

Plants in the Wetlands

Assistant Instructor Teaching Notes:

- Don't let students spend the entire 10 minutes on their plant sketch, they also need to add the spheres to their drawing.
- Help students who are struggling to create bubbles around their plant drawing. Potential questions include:
  - What are some things plants need to survive?
  - Are there things that plants put into the ecosystem?
  - Does anything need plants to survive?
  - Remind students that they can have biosphere bubbles as well.
- The goal is for students to feel like they **recognize and do science** while investigating their plant. For student who aren't struggling with the activity ask questions like:
  - How are you using science to look at this?
  - What are you wondering about?
  - What evidence are you finding of plants interacting with other spheres?
  - What tool(s) are you using to help you explore?
  - What have you written in your scientific notebook?
- Help students plant during restoration.
  - Check in with students as they get to various CHECKPOINTs and be sure they have completed everything before giving them the go ahead to move on.
  - Supervise watering of plants- don't let students overwater.
- If you are with the LAST GROUP of the day at this station, when students move on to self-reflection:
  - Fold tarps and return to storage.
  - Empty water cans and return to storage.

Note: If there are two groups doing restoration have them sit in separate areas for intro and Investigating Plants portion.

Timing for this station:

- Walking (~5-7 min)
- Investigate Plant using Science Notebook (13-15 min)
- Restoration (20 min)

Investigate a Plant using Science Notebook:

- (Walk to plant restoration area.)
- (Have students sit/stand in a circle.)
- Intro:
  - If they are present, introduce scientists from US Fish and Wildlife Service.
    - Name, job description
    - We will be helping them to restore the wetland here.
  - At this station you will investigate - **How plants interact with the other spheres in the wetlands**.

- (Have students open up to "Plants in the Wetlands" page in their science notebooks.)
- Sketch a plant in the center of your page.
    - (Show example.)
- Then consider what things your plant needs from other spheres to grow.
    - (Ask students to give you one example of something plants need to grow.)
    - (Show this in example science notebook.)
        - (Ex. Water. What sphere is water in? Hydrosphere. So somewhere around our plant we will draw a bubble and in it write "Hydrosphere – water" then we will draw an arrow from the bubble the plant because plants need water to survive and grow.)
- Place as many different bubbles around your plant as you can think of.
    - Remind students that they can have more than one example of each sphere and that they can include biosphere bubbles.
    - If students need reminders of the spheres, they can go back one page and there is a table they can use.
- Expectations for activity:
    - You will have about 4-5 minutes to work on your sketch.

- Allow students time to work:
    - (Lead and Assistant instructors should interact with students as much as possible. Remember the goal is for students to feel like they **recognize and do science** while investigating their plant.)
        - Potential questions to ask students include:
            - How are you using science to look at this?
            - What are you wondering about?
            - What evidence are you finding of plants interacting with other spheres?
            - What tool(s) are you using to help you explore?
            - What have you written in your scientific notebook?
- Process Reflection Plants in the Wetlands:
    - What evidence did you find that your plant is interacting with other spheres?
        - (Ask students what observations lead them to their response.)
            - Ex. Biosphere – Spider. A saw a spider web on my plant so I know spiders use plants as a home.
            - (If a student names an item from a sphere (ex. plants grow in soil) write "Soil" in a bubble but ask them which sphere "soil" belongs to. Then add that to the bubble "Soil – Geosphere".)
    - Think-Pair-Share: What do your observations tell us about why wetlands are important?
        - ***Do NOT skip this question – if time doesn't allow for a Think-Pair-Share do a whole group discussion.**

Restoration:

- Introduce the concept of restoration.
    - Lots of plants in some areas and none in others.
        - Why might there not be any plants some places?
    - Restoration – to restore something to how it used to be.

        - We will work to add some plants to places where there are none because plants are an important part of the wetlands.
        - Students like yourselves have been working on helping to restore this wetland for several years.
            - (Show poster of Sweetwater Marsh in 2018.)
            - Ask students what they notice that is different about the area now versus then?
    - Ask students if there is anything in their backpack that could be helpful when doing restoration? – Gloves.
- Restoration Directions. Explain that students will need to check in with an adult at each CHECKPOINT.
    1. Fill up a bucket with two shovels of fresh soil
        - Each student can put one shovel full of soil in.
    2. Pick a plant.
    3. An instructor assigns them a hole.
        - **CHECKPOINT**: You must have a bucket with the proper amount of soil and a plant and show it to an instructor before they will assign you a place to plant.
    4. Deepen & clear out hole using hands.
        - Entire pot should fit into hole.
        - **CHECKPOINT:** Instructor needs to make sure hole is deep enough before you proceed.
    5. Loosen the roots by doing "plant CPR".
        - Place plant on side, press down on pot, and roll until soil loosens.
    6. Place hand on top of soil and flip pot upside down so plant & soil falls out into hands.
    7. Place plant in hole and fill in with soil from bucket.
    8. Cover fresh soil with some of the existing brown soil.
        - Form a bowl around the plant, with soil slightly higher further out.
        - **CHECKPOINT**: Instructor must check you plant before you begin watering.
    9. Water plant and get all of the surrounding soil wet, but not drenched.
        - ~10 seconds per student.
        - **CHECKPOINT**: Closely monitor students so they do not overwater plants.
- (Students work in partners with one plant.)
- Debrief restoration.
    - (Have students sit/stand in a circle.)
    - Great job making a difference and helping the wetlands!
        - Ask 2-3 students how it felt to help restore the wetlands.
    - Remind students that they have wetlands in their own community.
        - Ask students if they think they could do something similar in City Heights?
    - They will have the opportunity to make a difference and help out their local canyon when they visit the Living Lab next week.
- Have students thank Chantel or other USFWS staff, if present, and walk to next station.

Animals in the Wetlands

Assistant Instructor Teaching Notes:

- The goal is for students to feel like they **recognize and do science** while investigating how animals interact with other spheres. Potential questions include:
    - How are you using science to look at this?

Timing for this station:

- Trail Walking/Sit spot (20 min)
- Bird Blind (15 min)
- Debrief Bird Blind (5 min)

Trail Walk:

Intro:

- As we walk along our goal is to investigate - **How animals interact with the other spheres in the wetlands**?
    - (Remind students they can use any tools in their explorer backpacks.)
- While walking students need to stay between Lead Instructor and Assistant Instructor.

Trail Walk:

- (Give students the trail map and allow students to guide where the group goes. At various junctions, you can ask them which direction they want to go (as long as you don't get too far from where you need to end up!)
    - Options while walking to Sit Spot:
        - Ask student to find an animal or evidence of an animal.
            - Discuss what spheres that animal is interacting with.
            - (They do not need to write this in their notebook- it can be done verbally.)
        - Do a Plant Scavenger Hunt.
            - Call out a certain plant from their Wetland Plant and Animal ID guide and have all students find that plant somewhere close by and stand near it.
- Sit Spot/Sound Map (You in the Wetlands)*
- **Teaching Note: On days w/ four classes this becomes its own station – "You in the Wetlands".*
    - *Between your last location and your next location find a spot where students can spread out and sit down.*

- Find an out of the way location on the trail.
    - (Have students open to an "Extra Space" page in their science notebook.)
    - Explain that they are going to do a sound map.
    - Have them draw a small stick figure of themselves in the middle of their page.
    - In a moment we are going to sit silently for three silent minutes listen to the world around us.
        - While you are listening, write or sketch the things you hear around you.
        - Remember to write what you HEAR not what you SEE.
- (Have students sit quietly for two minutes and create their sound map.)
- Bring students together to debrief:
    - What are some sounds you heard?
    - Where there any sounds you did not recognize? What could that have been?
    - Where you surprised at how many sounds there were when you stopped to listen?

- Discuss with students the importance of taking time in our lives to pause and observe what is around us.
    - *o* This can be done anywhere – in our homes, a park, a neighborhood street.
    - *o* Often we are so busy moving from one place to another, talking, or engaging with our phones that we don't take the time to notice all the things/sounds around us.
    - *o* As science leaders we always want to be observing our environment.

Bird Blind:

Intro:

- Remind students they are investigating - How animals interact with the other spheres in the wetlands.
    - *o* (Have students open up to "Animals in the Wetlands" page in their science notebooks.)
- Review expectations:
    - *o* We are at a bird blind - a great place to observe birds.
    - *o* In a moment we will all use your binoculars and our eyes to look for birds in this area.
    - *o* Everyone will choose one bird to investigate.
        - Sketch your bird in the center of your page.
            - (Birds move quickly so your sketch does not need to be perfect.)
        - Then consider what spheres your bird interacts with.
            - (If this is your first station go through an example in your Science Notebook – *see Plants in the Wetlands above*.)
        - Place as many different bubbles around your bird as you can think of.
            - Remind students that they can have more than one example of each sphere and that they can include biosphere bubbles.
    - *o* We all need to move slowly and quietly to not disturb the birds.
    - *o* You will have approximately xx minutes to work.
    - *o* (Have students spread out in the bird blind.)

Bird Blind Activity:
**If there are no birds after 3-4 minutes allow students to choose a bird to sketch in their notebook from the bird info boards. When they are finished do more of trail walking if time remains.*

- (Lead and Assistant instructors should interact with students as much as possible. Remember the goal is for students to feel like they **recognize and do science** while investigating their bird.)
    - o Potential questions to ask students include:
        - What evidence are you finding of your bird interacting with other spheres?
        - What tool(s) are you using to help you explore?
        - What have you written in your scientific notebook?
        - How are you using science to look at this?
        - What are you wondering about?

Process Reflection Animals in the Wetlands:

- Ask students to share:
    - o What bird did you draw?
        - In what ways was your bird was interacting with other spheres?

- (If a student names an item from a sphere (ex. I saw my bird standing on the sand) write "Sand" in a bubble but ask them which sphere "sand" belongs to. Then add that to the bubble "Sand – Geosphere".)

- What other animals did we see on our walk over? What spheres were they interacting with?
- *Think-Pair-Share: What do your observations from our walk and time at the bird blind tell you about why wetlands are important?
  - ***Do NOT skip this question – if time doesn't allow for a Think-Pair-Share do a whole group discussion.**

Humans in the Wetlands

Assistant Instructor Teaching Notes:

- The goal is for students to feel like they **recognize and do science** while investigating how humans interact with other spheres. Potential questions include:
  - How are you using science to look at this?
  - What tool(s) are you using to help you explore?
  - What are you wondering about?
- During Trash Clean-Up:
  - Help students collect trash into trash bag.
  - Make sure students stay within boundaries.
  - Be sure students don't pick up any sharps.
- During Humans in the Wetlands Activity:
  - Help students who are struggling to create bubbles around their human drawing. Potential questions include:
    - What evidence of humans do you see?
    - How is trash impacting other spheres?
    - What other evidence of humans do you see besides trash?

Timing for this station:

- Walking (~5 - 7 min)
- Intro (5 min)
- Humans in the Wetlands Sketch (5 min)
- Process Reflection (5 min)
- Clean up Trash (13 - 15 min)
- Process Reflection (2-3 min)

Intro:

- At this station you will investigate - **How humans interact with the other spheres in the wetlands**.
  - Take a look around you. What do you notice about how humans interact with other spheres in or near the wetlands?
    - (Remind students that just like when they looked for evidence of animals- they do not always need to see humans to know they were here. Ask students what evidence they see of humans.)

- *o* (Have students open up to "Humans in the Wetlands" page in their science notebooks.)
    - Draw a picture of a person on the center of your page.
    - Then consider what spheres humans interacts with in the wetlands and add them to your drawing.
        - (If this is your first station go through an example in your Science Notebook- *see Plants in the Wetlands above*.)
    - Place as many different bubbles around your human as you can think of.
        - Remind students that they can have more than one example of each sphere.
- *o* You will have x minutes to work on your sketch.
- *o* (Have students spread out, sit down, and work on their sketch.)

Humans in the Wetlands Sketch:

- (Lead and Assistant instructors should interact with students as much as possible. Remember the goal is for students to feel like they **recognize and do science** while investigating how humans interact with other spheres in the wetlands.)
    - Potential questions to ask students include:
        - What evidence are you finding of humans interacting with other spheres?
        - What have you written in your scientific notebook?
        - What are you wondering about?

Process Reflection Humans in the Wetlands:

- Ask students to share:
    - What evidence did you find that of humans interacting with other spheres?
    - *Think-Pair-Share: What do your observations tell us about how humans are impacting the wetlands?
        - ***Do NOT skip this question – if time doesn't allow for a Think-Pair-Share do a whole group discussion.**

Trash Clean-Up:

- Several of you have noticed that while humans can interact with the wetlands in good ways – swimming in the water, breathing the fresh air, looking for plants and animals, etc. there are ways that humans are negatively interacting with the wetlands – development, pollution, trash, etc.
- Today we have a chance to make a real difference – by helping to clean up some of the trash in the wetlands.
- US Fish and Wildlife has given us special permission to go over this rope to the beach and help remove this trash.
- It is important to look for small trash as well as large trash.
    - Small trash can be even more harmful than larger trash as animals can eat it thinking it is food.
- Review expectations:
    - We will set up a transect tape and everyone will look for trash along the tape.
    - You can bring any trash you find to an instructor who will have a trash bag.
    - Everyone must be wearing gloves.
        - Do not touch the water with your gloves.

- Feel free to sift through the sand for any pieces of trash that might be right below the sand.
- Do not pick up any sharp or dangerous items- call an instructor over.
- Do not pick up any animals.
- Do not step on plants to collect trash.

- Let's all go help the wetlands and make a difference!

Trash Clean Up:

- (Collect trash for ~10-15 minutes. Gather everyone back on the trail when done).

Process reflection:

- Ask students:
  - Why you think it is important to clean-up trash in the wetlands?
  - How does it feel to make a difference in the wetlands?
- Thank students for making a difference.
- (Last group should carry trash bags back with them other groups can leave trash to be carried out by last group.)

Lunch (25-30 min)

- Give students an opportunity either before or after lunch (when you are close to restrooms at the Living Coast or USFWS) to use the restrooms and fill up their water bottles if they need to.
- Eat lunch with students out in the field (see schedule for your group's location).
- Be sure students throw away all trash into our trash bags.
- Give students hand sanitizer when finished with lunch.

Self-Reflection

Assistant Instructor Teaching Notes:

- € Sit with students and model good listening behavior during intro.
- € Participate in Circle Toss Activity

Timing for this station:

- Walking (~5 - 7 min)
- Circle Toss Activity (~13 - 15 min)

Circle Toss Activity:

Introduction to Reflection:

- (Have students sit down in a circle and hand each student a half sheet of paper.)
- You have done a lot of science with Ocean Discovery today and now it is time to reflect on our experiences.
- Explain why we reflect to students.
  - Reflecting is the process of exploring your feelings, experiences, and learning to build connections.

  - Reflecting is important because it is an opportunity to share your thoughts, ideas, and feelings. Everyone's voice is important and should be heard.
  - Sharing your reflections can allow others to learn new ideas and perspectives, and can create greater compassion and empathy in our world.
- Remind student to **Be Their Best Self**.
  - While parts of today may have been tiring (walking, working in the sun, etc.) try to consider everything you did and be respectful in your answers.

Circle Toss Intro:

- Ask students to write down three words about how they feel about doing science today.
  - Give students some examples: proud, calm, interesting, impactful, etc.
- Give students 2-3 minutes to write their words down on their paper.
  - Tell students to write their words as neatly as possible.
  - If they have extra time they can draw or sketch on their paper.

Circle Toss Activity:

- Once everyone has written their words have the students crumple it up into a ball.
- (Have students stand up and form a circle.)
- Circle Toss:
  - Have all students throw their papers into the center.
  - Have each student pick up a paper that is not theirs.
  - Repeat this process several times.
  - Finally have each student pick up a paper ball and hold onto it.
- Remind students the question was how do you feel about doing science today?

Reflection:

- Explain that we will go around the circle and have each person read the three words off the paper in their hand until everyone has done so.
- Remind students to **Be Their Best Self**.
  - Be respectful:
    - All voices are important and should be heard.
    - Use your best voice when reading someone's thoughts.
  - Be curious:
    - Use your best listening skills when hearing others thoughts. Are you surprised by what you hear? Did someone think differently than you?
- Thank students for sharing their thoughts about doing science.
- If time allows have students do a THINK-PAIR-SHARE and answer the question:
  - What are you most excited to tell your family about today?
- (Have all students throw paper balls into trash bag.)

<u>Clean up + Goodbye + Load Buses</u>

(If using the "A Little Late" or "A Lot Late" schedule skip this entirely, but have kids line up backpacks in that way that will make it easier for you during clean up (straight line, multiple lines of a few, etc.) and do "Go Awesome!" cheer.)

Clean up - Science Notebooks

- Have students sit in a circle and take out their Science Notebooks.
- Have student hold notebooks up and make sure every notebook has a first, last and teacher's name on it.
- Collect notebooks and let students know they will get them back when they come to the Living Lab.
- Collect all notebooks and place in a folder with school and teacher's name on it.

Clean up - Water Bottles & Explorer Backpacks

- Collect water bottles.
- Clean out explorer packs.
    - Have students empty out their backpacks onto the grass.
    - Collect a pair of gloves from each student.
        - **THESE WILL BE TAKEN BACK TO THE LIVING LAB TO BE WASHED.**
    - Have students make sure they have each of the following:
        - Binoculars (1)
        - Hand lens (1/pack)
        - Pencil (1/pack)
        - Wetland Plant and Animal ID Card (1)
        - Ziploc bag (1)
    - If anyone has extras of anything collect them. If anyone is missing something replace it.
    - Have students throw any garbage from their explorer packs into the trash bags.
    - Have students' clean binoculars and hand lenses:
        - Give each pair of students a piece of lens paper to clean off eye pieces of binoculars and hand lens. Demonstrate.
        - Throw all used lens paper into garbage bin.
        - Make sure these go in the correct bags.
    - Have students replace everything into their bags.

Goodbye

- Remind students that you will see them one final time when they come to the Living Lab where they will continue to do science and explore a wetland in their own neighborhood.
- Thank you for being your best self today scientists!
- At Ocean Discovery Institute we **BELIEVE** that science is something you can do and a scientist is someone you can be, that you can **ACHIEVE** in science and think critically about our world, and you can **LEAD** in science and conservation and make a difference in the world. Because we believe this, we do a "Believe! Achieve! Lead! Go Awesome!" cheer at the end of every program so that you will continue to do awesome things after we leave.
- On the count of three we will yell "Believe! Achieve! Lead! Go Awesome!"
- Walk students back to bus area.

Clean Up & Return to Lab:

- Report to Alexa any supplies that are running low in the General Bin (bandanas, notebooks, etc.)
- Clean USFWS bathrooms – sweep floors, wipe any debris or stains from sinks & toilet.
- Clean and sweep Breezeway especially if there was a mess from lunch.
- Put away restoration tools in USFWS trailer.
- Empty garbage and paper into recycling can.
- Restock backpacks:
  - Science notebooks
- Organize explorer packs (if there wasn't time for students to do this).
- Put all items into storage in the USFWS Classroom closet.
- Take dirty work gloves back to Living Lab.
- Return to Living Lab and:
  - Run water bottles through dishwasher at Living Lab.
  - Wash and dry work gloves.
  - Return USFWS keys to lockbox
  - Place folders with science notebooks into file box in Living Lab.

<u>Humans in the Wetlands</u> (Alternate Activity)

Assistant Instructor Teaching Notes:

- <u>During Intro and Process Reflection sit with students and mode: Be Your Best Self!</u>
- During Rare Pokémon Card:
  - Walk around and help students create their card.
  - Ask questions:
    - Why do you think it's important to take care of the wetlands?
    - What is one way people can help protect the wetlands?

Timing for this station:

- Intro (5 min)
- Humans in the Wetlands Sketch (5 min)
- Process Reflection (10 min)
- Rare Pokémon Card (15 min)
- Process Reflection (5 min)

<u>Intro:</u>

- At this station you will investigate - **How humans interact with the other spheres in the wetlands**.
  - Take a moment to think about how humans can interact with a wetland.
    - Remind students that just like when we look for animals, we rely on evidence of the animals because they are not always there.
    - The same is true for humans, we do not always need to see humans to know they were in a wetland (example: footprints in the mud, a candy wrapper, etc.)
  - (Have students open up to "Humans in the Wetlands" page in their science notebooks.)
    - Draw a picture of a person on the center of your page.
    - Then consider what spheres humans interacts with in the wetlands and add them to your drawing.
      - (If this is your first station go through an example in your Science Notebook- *see Plants in the Wetlands above*.)
    - Place as many different bubbles around your human as you can think of.
      - Remind students that they can have more than one example of each sphere.
  - You will have x minutes to work on your sketch.

<u>Humans in the Wetlands Sketch</u>:

- <u> </u>(Lead and Assistant instructors should interact with students as much as possible. Remember the goal is for students to feel like they **recognize and do science** while investigating how humans interact with other spheres in the wetlands.)
  - <u> </u>Potential questions to ask students include:
    - What ways do humans interact with other spheres in the wetlands?
    - <u> </u>What are you wondering about?

<u>Process Reflection Humans in the Wetlands:</u>

- Ask students to share:
  - What ways do humans interact with other spheres in the wetlands?
  - *Think-Pair-Share: What do your observations tell us about how humans are impacting the wetlands?
  - It is important to realize that humans interact with wetlands in both positive and negative ways.

- The wetland we are visiting today, is part of a National Wildlife Refuge.
  - US Fish and Wildlife work to protect this land and the plants and animals that live here.

- It is very important to protect wetlands because there are not many wetlands left.
  - Wetlands like this once covered our coastline in Southern California.
  - Today over 95% of these have been destroyed.
  - What do you think has happened to the wetlands?
    - Building – Many wetlands have been built upon. Those wetlands are now buildings, roads, parking lots, homes, etc.
      - What happens to the plants and animals that lived in those wetlands?
    - Foot traffic – When people walk on the edge of paths or off paths, they can step on and kill plants, and make trails through animals' habitats.
      - Having too many trails create a "freeway environment" which is difficult for wildlife to survive in.
    - Trash and pollutants/animal waste – Unfortunately, many people who visit wetlands leave trash behind. Additionally trash and animal waste from our own neighborhoods can be washed off our streets when it rains and carried through storm drains to the wetlands and bay.
      - How do you think trash and animal waste could effect the plants and animals that live in the wetlands?

- In fact, because of all of these impacts from humans, many of the plants and animals that live in the wetlands have become endangered.
  - Ask students: What does endangered mean? *A plant or animal that is in danger of going extinct*.
  - There are many endangered species in San Diego.
    - San Diego actually has the most different types of animals of any place in the United States, but it also has the greatest number of endangered species.

- Here are a few examples of endangered species that you can find here in this wetland.
  - Light footed clapper rail:
    - The light footed clapper rail is a very smart bird.
    - It builds its nest out of cordgrass so that it is floating on the water.
    - It attaches the nest to a piece of cordgrass so that it floats up and down like an elevator when the water comes in and out, but it doesn't float away.
  - Western harvest mouse:
    - The western harvest mouse has lost a lot of its habitat and is left with nowhere to hide from predators.

        - Another threat to the harvest mouse is house cats. Cats do not know that the mouse is endangered and will often catch them.
    - Salt marsh bird's beak:
        - Do you think plants can be endangered too?
            - Most people think only of animals when they think of endangered species.
            - Plants can actually be endangered, too.
        - This plant can be found here in this wetland and it is one of the only places that it can be found in the whole world.

- Today you are going to create a Rare Pokémon Card for one of the endangered wetland species.
    - (Show the Example Rare Pokémon Card.)
    - Pokémon cards are "rare" because there aren't many of those cards available.
        - The same is true for our endangered species – there aren't many of them left.
    - These species are rare for a reason.
        - Humans have impacted their habitat here in the wetlands.
    - We will create a rare Pokémon card for them because we want other people to know about them and how they can help to protect their habitat so that someday these species aren't endangered!

- To make your card, you will get:
    - A Rare Pokémon Card Worksheet to make your poster.
        - (Show Rare Pokémon Card Worksheet.)
    - An information sheet for a species of plant or animal that is endangered.
        - (Show one of the Endangered Species of the Wetlands Biographies.)

- To create your card:
    - Write the name of your plant/animal.
    - Draw a sketch of your plant/animal.
    - Share 1-2 ways people can help protect your plant/animal.

Rare Pokémon Cards

- Hand out materials and let students work.

Process reflection:

- Ask students:
    - Why you think it is important to take care of the wetlands?
- Be sure to share your card with friends and family!
    - One the ways we make a difference in the worlds is by educating others.
    - Not everyone knows how cool the wetlands are – but you know!
    - Now you can share with people why they are important and how they can help care for the wetlands even in their own neighborhood.

Make a Difference Day

Living Lab Experience

Goal: Students build belief that science is important and relevant, that they can make a difference, and that a career in science is a possibility for them.

Make a Difference Actions:

- (Today) I plant seedlings to protect the kelp forest.
- (Tomorrow) I am an engineer who investigates the wetlands.

Supplies:

Arrival:

- ___Chaperone volunteer cards (1/chaperone)
- Cover sheets & rosters (1/class)
- Stop signs (2)

Introduction:

- 5th Grade Make a Difference Day PowerPoint
  - Papi://Curriculum/SI New/Upper Elementary (3-5)/5th Grade/5th Grade Visuals
- ___Science Notebooks (1/student)
- ___Pencils (1/student)
- ___Water cups (1/student)
- ___Butcher paper (1/roll)
- ___Sharpies (4)

Self-Reflection & Believe Survey:

- ___Post-Its
  - **o** ___Yellow (100)
  - **o** ___Blue (100)
- ___Large sticky chart paper (8 sheets)
- ___Believe surveys (1/student)
- ___Laptops w/teacher survey (2)

Make a Difference – Tomorrow:

- ___Rokenbok (assorted pieces sorted into 12 art bins)
  - **o** ___Minimum 4 wheels/bin

Make a Difference – Today:

- ___For Zipline set up (details & photos in "Supplemental Materials: Zipline Set-Up" below.
  - 150 feet Paracord – 550 Type III 5/32in x 150 ft
  - Ratchet & #13 Ratchet attachment
  - Adjustable wrench
  - 2 bolts (thin enough to fit through holes of poles) – 3 inches in length, accompanied with 2 bolts and 2 washers to fit
  - Pulley
  - Tension hook
  - 2 Square metal poles with holes (about 4 feet in height)

- Sili-dry Silicone Spray
- 10 Zip ties
- Scissors (to cut zip ties)

- ● Blue buckets w/carbineers (35)
- ● Rocks for weight (1-2/bucket)
- ● Seeds (3 native plants, 5 seeds/student)
- ● Watering cans (5)
- ● Sharpies (5)
- ● Grown plants (1 per native plant, planted in Living Roof)
- ● Soil
- ● Trowels (5)
- ● Odi flags (10)
- ● Chalkboard w/instructions
- ● Extra cardboard boxes for teacher to take plants home

Lunch:

- ● Hand sanitizer (2)
- ● Blankets (10+)
- ● Orange jugs filled with water (2)
- ● Folding table (for water jugs) (1)

Timing:

Time	Group 1	Group 2
9:45-9:55	**Arrival** Watershed Plaza	
9:55-10:15	**Introduction** Eco Lab	**Introduction** SciTech Lab
10:15-11:00	**MAD Tomorrow** Eco Lab	**MAD Today** SciTech Lab/Living Roof
11:00-11:20	**Science Leader-Student Connection** Eco Lab	**Science Leader-Student Connection** SciTech Lab
11:20-11:45	**Lunch** The Commons	**Lunch** Fisler Family Tree
11:45-12:35	**MAD Today** SciTech Lab/Living Roof	**MAD Tomorrow** Eco Lab
12:35-12:45	**Believe & Teacher Survey** SciTech Lab	**Believe & Teacher Survey** Eco Lab
12:45-1:05	**Self-Reflection** SciTech Lab	**Self-Reflection** Eco Lab
1:05-1:15	**Clean Up + Goodbye**	

Program Set Up:

Arrival (Watershed Plaza/Discovery Gallery)

- € Bring out stop signs from transitional storage.
- € Collect rosters, cover sheets, and walking maps from transitional storage.
- € Open all shades in Discovery Gallery.
- € Print visitor badges for teachers (see rosters for names).

General (Eco Lab & SciTech Lab)

- € Open all windows and shades.
- € Set up seven tables with four chairs each (additional chairs off to the side).
- € Turn on Smartboard.
  - o Log into Zoom.
    - ▪ Test camera angle.
  - o Open PowerPoint.
    - ▪ Test sound on videos.
- € Spread one classes' science notebooks out on a table (one class at each location).
- € Pull out hand sanitizer and pencils from cabinet.
- € Set up chart paper and sharpies to use as a word wall at front of room.
  - o Write "Word Wall" at the top.
- € Set up water station:
  - o Put ~30 clean cups in the "clean" bin on top of water cooler.
  - o Place "dirty" bin next to it.
  - o Ensure water cooler is filled with water.
- € Set up for Self-Reflection:
  - o Write one reflection question on two pieces of chart paper.
  - o Two reflection questions = 4 total pieces of chart paper per location.
    - ▪ I think science is important because…. x 2
    - ▪ Scientists make a difference in the world by… x 2
  - o There are two of each poster so that Assistant Team Leads can put half the student responses on one poster and the other half on the

Arrival

Program Set Up Continued:

If bus is 10 minutes late – contact dispatch and update staff on timing.

Trip Lead Notes:

- € Discuss with Ocean Discovery staff who will take on each of the **Arrival Tasks** (see below).
- € Ask Jo details about next upcoming camp to share with students.
  - o Share these with Instructors.

- If walking with school, Trip Lead:
  - Introduce yourself to teachers and volunteers.
  - Take teachers aside and note any students absent on the roster.
  - Sign cover sheet stating they've collected all waivers to the best of their ability.
- If arriving by bus:
  - Two staff should be waiting at bus stop (corner of Thorn & 42nd) 10 minutes prior to arrival time
- (Meet buses or students walking.)
  - Take students and have them sit in the Watershed Plaza.
- (Begin Arrival Tasks.)
  - (Note: The below should take place simultaneously so students are getting an intro while the classroom teachers are dealing with rosters.)
  - Trip Lead (1)
    - For bus schools only: Take teachers aside and note any students absent on the roster.
    - Sign cover sheet stating they've collected all waivers to the best of their ability.

  - Instructor (1)
    - Take adult chaperones aside and discuss expectations for the day.
    - You will be asked to introduce yourself – name, how you got involved with Ocean Discovery, etc.
    - Provide each one with an "Ocean Discovery Institute Field Trip Volunteer" card and explain how they can be most helpful today:
      - Be your best self: be present- no cell phones; sit & participate in activities with students; be a partner with a student during pair-shares.
      - Be safe: help students make good choices concerning their safety
      - Be respectful: don't have side conversations when instructors are teaching
      - Be curious: ask questions of students and try to engage students who seem disengaged.
        - On your card there is a list of questions you can ask students.

  - Instructor (1)

- Review Community Agreements:
    - Working as a team of scientists and we all must agree to follow a certain set of expectations.
    - At Ocean Discovery we believe everyone should Be Their Best Self.
        - (Show Community Agreements slide.)
    - **To Be Your Best Self**, you should:
        - **Be curious!**
            - Ask questions, make observations, and share your thoughts and ideas.
        - **Be respectful!**
            - Respect people, living things, and the environment around you.
        - **Be safe!**
            - Take care of yourself and others.
    - Ask students to give a silent thumbs up if they can agree to be their best self when working with Ocean Discovery.
- Introduce Living Lab
    - Even though they will be passing by offices and people, they do NOT need to be quiet. They are welcome to talk in a normal voice.
    - The Living Lab is theirs & should be a place they feel comfortable being themselves & exploring.

- <u>Assistant Instructors (2)</u>
    - Take lunches to the Achievement Alcove and then return to Watershed Plaza.

- Once all staff members have returned Trip Lead will dismiss students and teachers by group (each class is a group) and instructors will walk them to their Introduction area.
    - Students high five ODI statue on the way past.

Introduction

Assistant Instructor Teaching Notes:

- € Help students find their science notebook and take a seat.
- € Help to hand out reusable cups.
- € Sit with students during introduction and model good listening skills.
- € Participate in sphere kinesthetic movements.
- € Whenever appropriate throughout the day add words and definitions to the "Word Wall".

Timing for this station Eco Lab:	Timing for this station SciTech Lab:
• Bathroom Break (3 min) • Staff, volunteer, and Living Lab intros (3 min) • OL Video + Debrief (4 min) • Review Science Notebook/Wetland/Spheres/Make a Difference (5 min)	• Staff, volunteer, and Living Lab intros (3 min) • OL Video + Debrief (4 min) • Review Science Notebook/Wetland/Spheres/Make a Difference (5 min) • Bathroom Break (3 min)

Science Notebook:

- As students enter the space have them find their science notebook and then take a seat.
- Show students where reusable cups and water are.
- Show students where dirty cups go – try to hold onto your cup throughout the day.

Staff and Volunteer Intros:

- Staff and volunteer introductions:
  - All staff + volunteers take one minute each to introduce themselves and share their story.
- Review Community Agreements.
  - (Show Community Agreements slide.)

Living Lab Intro:

- Welcome students to the Living Lab.
  - Ask if anyone has visited before?
  - The Living Lab is your Ocean Discovery Home. It is a place where you can come to learn science, do homework, participate in activities, and lots of other things.
  - At the end of the day today, I will let you know about upcoming opportunities to return to the Living Lab after today.

Introduce Ocean Leader Video

- I'd like to introduce you to a science leader who grew up in City Heights and worked with Ocean Discovery just like you who know works in the field of science.
- Meet Sonya Vargas, who is a Senior Biologist.
- (Play Ocean Leader video on PowerPoint.)

Debrief Ocean Leader Video:

- Potential whole group questions include:
  - (Show Ocean Leader Questions slide.)
  - In what ways is (Ocean Leader) like you?
  - Is (Ocean Leader) a science leader? How do you know?
  - What are somethings he/she does for their job?
- Think-Pair-Share for the following question:
  - (Show Think-Pair-Share slide.)
  - Do you think you COULD be a science leader if you wanted to? Why or why not?
    - For some students you may need to clarify: You don't have to want to be a scientist. The question is, could you if you wanted to?
  - Have 2-4 students share their thoughts. Follow up questions could include:
    - What kind of scientist would you like to be?
    - What would you like to study as a scientist?
    - Do you think it is difficult to become a scientist? What would make it difficult? What could you do to overcome those challenges?

Review Science Notebooks:

- Remember you will have one of the most important tools of a scientist in your hand- a science notebook.
- You used it to write down and draw your thoughts, questions and observations.
- We will use the notebook as a group at certain times throughout the day but you can write things down in your notebook at ANY time.

Review Wetland & Spheres:

- (Show Wetlands slide.)
- Review definition of wetland.
  - Wetland = where water and land meet
  - (Add "Wetland" and definition to the Word Wall.)
- Last week we visited a wetland and investigated how the biosphere (plants and animals including humans) interacted with the other spheres.
  - Review, through questions or think-pair-share, definition, examples, and hand motions for:

- (Add "Atmosphere", "Geosphere", "Hydrosphere" and "Biosphere" and definition to the Word Wall.)
  - Atmosphere
  - Geosphere
  - Hydrosphere
  - Biosphere
- (Write examples on the board on Spheres slide.)

- Ask students to share some examples they remember of the different spheres interacting and why those interactions were important.
  - Example: I saw a bird (biosphere) wading in the water (hydrosphere) the bird was looking for food in the water.
  - Example: I saw a plant (biosphere) in the soil (geosphere) the plant needs nutrients from the soil to grow.

Make a Difference:

- There are wetlands here in your neighborhood just like the wetlands you visited at the Sweetwater Marsh.
  - (Have students look out into the canyon.)
  - It may look dry now but when it rains water collects in the canyon creating a stream.
    - (Show students "Rain in the Canyon Video" in PowerPoint.)
  - Today we will take all the knowledge we have gained about wetlands and focus on how humans can make a difference in the wetlands.
- Introduce the concept of Making a Difference and protecting wetlands.
  - Potential questions include:
    - Do you think wetlands are worth protecting? Why or why not?
    - How many different living things rely on the wetlands for survival?
  - Over the last few weeks, you have learned a lot about the wetlands and the plants and animals that live there. Today we will learn how we can Make a Difference and help protect the wetlands and the plants and animals that live there.
  - *o*

Make a Difference Today

Objective: Students become restoration biologists and help restore wetlands in their community by planting seeds and ziplining the seedlings to a holding location from which they will later be planted in a neighborhood canyon.

Assistant Instructor Teaching Notes:

- Spread out, sit and model good listening behavior during intro.
  - Whenever appropriate add words and definitions to the "Word Wall".
- Help student add things that seedlings need to their picture in their science notebook. Potential questions include:
  - What are things that plants need to grow?
  - What sphere is that part of?
- When walking to Living Roof point out canyon as a wetland and a place where the seeds they grow will eventually be planted.
- During planting:
  - Help students plant and water their seed.
  - Be sure students don't place seeds too deep in soil or overwater their seedling.
- During Plant Ziplining:
  - Take half the students down to Grow Zone.
  - Manage the removal of plants from zipline and placing of seedling pots into grow zone in an orderly manner.
  - Be sure students are responding "Zip On!" only when appropriate – model this.

Timing for this station:

- Restoration Biologist & Spheres (10 min)
- Walk to Living Roof (5 min)
- Plant seeds & water (15 min)
- Zipline Plants (10 min)
- Process Reflection (5 min)

Restoration Biologist & Spheres:

- Over the last several weeks we have learned how important wetlands are and how within the wetlands, each sphere is dependent on the other spheres.
- Introduce Making a Difference.
  - *o* As scientists it is important that we not only learn about science, but we also take that information and try to make a difference in the world.
  - o One of the ways science leaders make a difference is by working to restore wetlands so that all living things, including humans, can continue to enjoy them.
- Introduce restoration biologists.

- Today we will work as restoration biologists to make a positive impact on our local wetlands.
- Define restoration biologist = a scientist who restores or helps to bring back life to an area.
- (Add "Restoration Biologist" and definition to the Word Wall.)
- We have worked as restoration biologists before, when we were at Sweetwater Marsh.
    - (Ask students what they did to help restore the wetlands- planted plants.)
    - By adding plants back to the wetland, we were helping to create a healthier wetland.
- Today we will be restoration biologists for City Heights.
- We will be helping to add more plants to the canyon right outside the Living Lab.
- More plants = a healthier wetland ecosystem.

- Introduce restoration project.
    - At Sweetwater Marsh we had plants already large enough to transfer to the ground but today we will actually begin the process by planting the seeds that will grow into plants that will be added to the canyon.
    - These plants will then be planted by an organization called "San Diego Canyonlands". Ocean Discovery helps San Diego Canyonlands by planting and growing lots of plants for the canyons in City Heights.
- Seeds, spheres and science notebook:
    - Have students open their science notebook to "Make a Difference Today: Restoration Biologist" page.)
    - As restoration biologists we need to think about what our seeds need to grow so they can become large enough to plant.
    - (Show Make a Difference Today slide.)
        - (Label/click the tiny circle "seed".)
    - Think-Pair-Share: What things will this seed need from other spheres to grow into a plant that we can add to the wetland?
        - Think: Allow students to add things to their diagram in their notebook.
            - Remind students they can look in their science notebook at page "Plants in the Wetlands" for help.
        - Pair: Give students one minute to share with a partner.
        - Share: Have students share their ideas and add them to the seed picture on the SMART board.
            - (Ask follow-up questions to create links to the different spheres.)
- When working on our restoration project we will need to think about all the things from different spheres that a seed needs to grow.

<u>Walk to Living Roof</u>:

- (Walk students up to Living Roof - out sliding door, down the canyon path around the property, then take the sidewalk up to the front door and enter the garden).

- Point out the canyon on your walk.
- This is where our plants will be planted in the future.

Plant Seed & Water:

- (Show students plants growing in planter.)
  - Bush Sunflower, California Buckwheat, and Black Sage.
  - Introduce concept of native plant.
    - We chose seeds from very specific plant to grow and use for restoration because they belong in this area and are likely to grow well in these conditions.
  - (Ask students if they can see all the things from the different spheres seeds need here in the planter.)
- (Show students how to plant a seed reminding them of the different spheres.)
  - Fill small nursery pots with fast-draining soil mixture (**geosphere**)
    - Leave top ½ inch of pot empty.
  - Use watering cans to dampen growing mixture (**hydrosphere**) until it feels moderately moist throughout.
    - Let water drain through drainage holes before planting seed.
    - **CHECKPOINT: It is important that the soil be wet throughout not just the top layer.**
  - Take ~5 seeds (**biosphere**) of your choice and space them ½ inch apart in pot.
    - Using a sharpie – Label your pot with the type of seed you are planting.
    - **CHECKPOINT: Be sure students only take 5 seeds of ONE TYPE OF PLANT**.
  - Press seeds into surface to anchor them.
    - Do not cover with soil.
  - Mist seeds lightly with water after sowing.
    - Be careful not want to overwater seeds.
    - **CHECKPOINT: Be sure seeds are firmly planted below the surface and soil on top is wet enough to stay in place during ziplining.**
  - Point out that the plants will use the air around them (**atmosphere**) to get carbon dioxide to grow.
  - After seeds are planted and watered put your pot in a blue bucket for ziplining.
  - (Show students where to place blue buckets to prepare for ziplining.)

Ziplining Plants:

- Restoration biologist we need to get our seeds from the Living Roof to the growing area down below.
- We will use the Ocean Discovery Plant Zipline! (Trademark pending. ☺)
- Explain two areas:
  - Half the class catch ziplining plants and take them from zipline to the Grow Zone.
  - Half the class will stay up here on the Living Roof to place plants on zipline.

  - (Spilt class into two groups.)
  - (Assistant instructor take half the students down to the courtyard.)
- Living Roof Instructions:
  - Line students up single file along railing with pile of plants at the end.
    - First person = closest to zipline
    - Last person = closest to plants in buckets
  - Show students how to attach bucket with carabineer.
    - To ensure team in Grow Zone is ready, person at plant zipline yells down to Grow Zone: "Zipping?"
    - When Grow Zone team responds "Zip On" then students may release the plant.
      - RELEASE PLANT ONLY – do not push plant.
  - Zipline Process:
    - Last person passes a bucket with plant down the line (toward the zipline).
    - First person attaches bucket to zipline and sends it down the zipline.
    - First person moves to back of the line, and the process continues.
- Grow Zone Instructions:
  - Safety: Explain that they must not stand under the line directly for safety
  - Line students up single file along pathway to back gate.
    - First person = closest to zipline
    - Lat person = closest to grow zone
  - Show students how to remove carabineer and pot from bucket.
    - To ensure team in Grow Zone is ready, person at plant zipline will yell down "Zipping?"
    - When Grow Zone team has cleared the zipline and you are ready, yell back: "Zip On".
  - Zipline Removal Process:
    - First person removes the carabineer from the line and passes the blue bucket down the line.
    - Last person removes the plant from the blue bucket and places it in the Grow Zone and then removes the rock from the bucket.
    - Stack the empty buckets in the clear bin. Stack rocks outside of the clear bin.
    - First person moves to back of the line, and the process continues.
- (Once all plants are done give students a round of applause.)

Process Reflection

- Great job restoration biologists! You helped make a difference today by planting seeds which will grow into plants which will be planted in our local wetlands!
- Think-Pair-Share: How did it feel to be a Restoration Biologist and make a difference in the world?
  - (Show question on PowerPoint.)

- Keep on the look-out for restoration days here at the Living Lab or with San Diego Canyonlands and you might be able to come back and plant your own seed in the canyon!

Make a Difference - Tomorrow

Objective: Students become engineers and design and build a robot to help clean up trash in the wetlands.

Assistant Instructor Teaching Notes:

- € Model good listening behavior during introduction.
  - o Whenever appropriate add words and definitions to the "Word Wall".
- € Sit next to students who are struggling to pay attention.
- € Help monitor students while other students are getting an up close look at FRED.
- € During Design Phase:
  - o Help teams who are struggling. Potential questions include:
    - What do you want your robot to do?
    - What can you design to help your robot pick up trash?
    - Do you want your robot to sort trash in any way?
  - o During the last two minutes of the design phase make sure all groups have settled on ONE design to build.
- € During Building Phase:
  - o Help distribute Rokenbok where needed.
  - o Check in with teams who are building. Potential questions include:
    - Tell me about your design?
    - How does your robot pick up trash?
    - Do you have any concerns about your design working?
  - o Monitor the testing area.
    - Help students consider what is working or not working about their design and if time remains encourage them to redesign.
    - Potential questions:
      - What is working?
      - What is not working how you imagined? What could you do to improve it?

Timing for this station:

- Review Spheres & Introduce FRED (10 min)
- FRED Pros and Cons (5 min)
- Design Phase (10 min)
- Building Phase (15 min)
- Share Design (5 min)

Review Spheres & Introduce FRED

- Discuss Humans & the Wetlands.
    - While at the Sweetwater Marsh we saw some ways that humans (biosphere) interacted with the wetlands.
        - One of the most important reasons scientists have science notebooks is so that they can refer back to notes they took to remind them of what they saw after some time has passed.
        - (Have students open their science notebooks to "How Humans Interact with the Wetlands" from the Explore Day.)
        - Ask students to name some of the ways that humans interacted with the wetlands.
    - Let's talk more about the trash we saw and helped remove from the wetlands.
        - Think-Pair-Share: How do you think most of that trash got to the wetlands?
- Introduce concept of a Watershed.
    - (Show watershed diagram on PowerPoint.)
    - Watershed = An area of land that channels rainfall and snowmelt to creeks, streams, and rivers, and eventually to bays, reservoirs, or the ocean.
    - (Add "Watershed" and definition to the Word Wall.)
        - Everyone lives in a watershed.
        - We live within the Pueblo San Diego Watershed.
        - The Pueblo San Diego watershed starts up in the mountains near Mt. Laguna and travels downhill through parts of San Diego all the way to the San Diego Bay. San Diego Bay is connected to the Pacific Ocean.
        - When it rains in City Heights, trash from our city gets washed from the streets through the watershed and eventually ends up in the ocean.
        - People in City Heights are directly connected to the ocean through our watershed.
        - The same is true for the Sweetwater Marsh, when people who live in that watershed litter, the trash eventually ends up in the wetlands and then the ocean just like we saw.
- Introduce Making a Difference.
    - As scientists it is important that we not only learn about science, but we also take that information and try to make a difference in the world.
    - One of the ways science leaders make a difference is by working to undo some the things that humans do that harm the environment.
- Introduce FRED.
    - Many scientists like you are concerned about how trash impacts the ocean and the wetlands. So how do we clean it up?
    - One type of scientist who has been studying this program are Engineers.
        - Define Engineer = scientist who designs and builds things.

        - (Add "Engineer" and definition to the Word Wall.)
    - Engineers here in San Diego wanted to design a way to get trash out of the ocean. Trash in the ocean can be difficult to get to, so engineers designed and built a robot to do this.
        - (Show FRED slide.)
    - This robot is called FRED, which stands for "Floating Robot for Eliminating Debris."
        - Define debris = trash.
        - How do you think a robot like this works?
    - (Invite each group to come up and take a closer look.)
        - (Ask students how they think the robot works to pull in trash/plastic).
    - Take a look at FRED in action.
        - (Show FRED video in PowerPoint.)

<u>FRED Pros and Cons</u>

- This is one of the very first versions of FRED. While FRED is awesome engineers realize after using FRED a few times that there are some flaws in their design.
- Engineers still have lots of testing and redesigning to do before FRED can go all around the world to collect trash.
- Once engineers build something, they must gather information about it by testing it to see what works and what doesn't work, and then improve upon their design and rebuild.
- Let's take a moment and think about what works and what doesn't work for the current FRED.
    - (Use a Pair-Share to have students create a pros and cons list for the current FRED design.)
    - (Create a pros and cons list on PowerPoint during Share portion.)

<u>Student Engineers & Design Phase</u>

- Ask student if they think that FRED would work if we took it to Sweetwater Marsh?
    - Probably not: *Too shallow, couldn't get trash from land, muddy ground, changing depth.*
- Today you will be engineers.
    - You goal is to design and build a robot like FRED that would be able to clean up trash in the wetland!
- Design Phase:
    - (Have students open to "Make a Difference Tomorrow: Engineering" page in their science notebooks.)
    - To start with you will brainstorm ideas for what your robot will look like with a team of engineers. You will create a sketch of your design in your science notebook.
        - When you are thinking about your design remember to include parts of your robot for picking up trash, include a way for your robot to move around, etc.
        - You will have ~7 minutes to come up with a design for your robot that will be used to clean trash up from the wetlands.
    - (Divide students into teams.)
    - (Put a timer up on the board.)

Building Phase

- Now you will be given supplies to build your design.
    - (Show Rokenbok blocks.)
    - If you need additional pieces raise your hand and someone will help you get what you need.
    - If you finish your design early, we have a testing location where you can see if your design works and make adjustments.
        - (Point to area with ping pong balls.)
        - The ping pong balls will represent trash.
        - When you are ready to test your robot bring it to the testing area and talk to the adult there. They will help you test your robot.
- (Give students 15 minutes to build their design with Rokenbok Blocks.)
- (Put a digital timer on the board and give students a five- and two-minute warning.)
- (Allow students to come and test their robot when they are ready.)

Process Reflection:

- More time option:
    - Have teams pair-up and share about their robots with each other.
    - Then have 1-2 teams come up and share with the whole class about their robot.
        - When students are sharing ask follow-up questions:
            - Tell me more about that.
            - Why did you add that part?
            - Can you tell us how your robot works? Cleans up trash?
            - Was there anything that didn't work as you planned when you tested your robot?
- Less time option:
    - Invite 1-2 groups to come up and share about their robot.
        - (See follow-up questions above.)
- Must cover:
    - Great job Engineers! Today, you gathered information about a problem, developed and sketched a design to improve upon an existing design (FRED), built and tested your design, and shared you design with other scientists – just like a true engineer!
    - One of the ways we can make a difference in the future is by considering a career as an engineer. Engineers have not currently designed a robot to clean up the wetlands so maybe that can be you in the future!
- (Have students disassemble their designs and put Rokenbok Blocks away.)

Science Leader-Student Connection

Objective of the Station: Students will meet a science leader, hear about their pathway to becoming a science leader, and have an opportunity to ask questions.

- Provide an overview of the Science Leader Student Connection portion of the program.
    - Today we will meet virtually with a science leader.
        - Learn about their pathway to becoming a science leader, what they do in their work, and their passion for the ocean and the wetlands.
    - You will also have the opportunity to ask the science leader questions.
        - (Brainstorm questions students want to ask – write these on a whiteboard where everyone can see.)

- Introduce Science Leader.
    - Tell the students who they are about to meet (science leader's name) a science leader who (describe what they do in 1-2 sentences and where they work).
        - (Connect Zoom Call).
    - (Welcome the Science Leader.)
    - (Conduct the interaction as one would an interview.)
        - Interview tips:
            - You may change the order or modify the questions based on the Science Leader's responses.
            - If a Science Leader is answering a question that may need to be wrapped up, you can move to the microphone which will signal them that you want to speak.
            - After the Science Leader answers a question, in a sentence or two, reaffirm the point they are making or acknowledge how it ties to the students' experience.
        - Interview questions asked by Team Lead (~10 min):
            - Can you please introduce yourself and tell us about your job and what you love about it? (2 minutes)
            - Tell us about your pathway to your current job. For example, what got you interested in science, your education, etc. (2 minutes)
            - Have you ever faced an obstacle or challenge in your life that you were able to turn into an opportunity? How did you do that? (2 minutes)
            - Students are investigating the wetlands and the animals that live there. Why do you think this work is important? (2 minutes)
        - Student questions (~5-10 min):
            - Give two or three students the chance to ask questions.
            - If needed, remind them about the questions they came up with earlier.

- (Have students say “Thank you!” and all clap for the science leader.)
- (Disconnect Zoom call.)

Lunch & Bathroom Break

- Before lunch have students take a bathroom break.
- Refill water bottles.
- Give hand sanitizer to each student before lunch.
- Give students a five-minute warning before clean up.
- Remind students that we are connected to the ocean through the canyon watershed and that

Assistant Instructor Teaching Notes:

- € Walk around and monitor students while they eat lunch – ask them questions about their experience
- € Hand out hand sanitizer
- € Monitor water cooler and help students refill water bottles
- € Walk around with trash bag when you see students starting to finish up
- € Supervise and encourage clean- up of surrounding area when clean up begins

any trash that ends up on the ground here can end up in the ocean so we need to be careful.

- Have students take 2 minutes to walk around and clean up their area.

Self-Reflection

Assistant Instructor Teaching Notes:

- € Help student write their post-it answers if they are struggling.
- € While Instructor reviews how a Gallery Walk works take student post-it responses and put them on the correct pieces of chart paper.
  - o Remove any negative responses (i.e. – This was boring, I want to go home, etc.)
  - o Try to spread responses out equally amongst posters (there are two posters for each response (so that students can spread out and see posters more easily).
- € Participate in Gallery Walk.
- € When necessary, remind students that the Gallery Walk is meant to be done quietly.

Timing for this Station:

- Intro & Post-It Writing (10 min)
- Gallery Walk & Intro (7 min)
- Closing (3 min)

Intro & Post-It Writing

- Introduce idea of self-reflection.
  - o (Use Self Reflection Slide on PowerPoint.)
  - o Important to take time to consider what you have learned about yourself during your time with Ocean Discovery Institute.
    - This is different than thinking about the science you have learned.
    - Self-reflection is about you and how your feelings about yourself or ideas have changed.
    - You have spent three days with Ocean Discovery doing science, learning about kelp forests, and making a difference in the world – now it is time to consider what you think about all of that.
  - o In a moment I will show you two sentence frames. You will answer each one on a different colored sticky note.
  - o You will have a few minutes to fill out two sentence frames.
    - (Project sentence frames from PowerPoint.)
    - (YELLOW) I think science is important because….
    - (BLUE) Scientists make a difference in the world by…
  - o Be sure to use the right color sticky note for each one.
  - o You do not need to copy the sentence frame.
    - (Demonstrate this concept.)
  - o (Give students 4 minutes to write.)

Gallery Walk & Intro:

- (While the Instructor introduces the Gallery Walk the Assistant Instructor will collect student answers and place them on the appropriate piece of chart paper. ***Scan responses and remove any that are inappropriate or negative***.)
- Introduce Gallery Walk
    - In a moment you will have a chance to look at other student's responses to the same questions you answered.
    - This is an opportunity to see how different people think about the same questions. You might find that some people have similar ideas to you and others may have different ideas. All are worthy of our time and energy.
    - Your goal is to walk around and look at student responses and find another person's response you like.
    - This is meant to be a quiet and reflective activity so work quietly.
    - There are four posters total. Try to visit all four in the time given.
- (Take students outside allow them to choose a poster and begin.)
- (Give students five minutes to read.)

Debrief:

- When students return and sit down, debrief their experience. Potential questions include:
    - Did you find a response similar to your own?
    - Did you find a response different from yours? What did that make you think?
    - Share a response you read that you liked. What did you like about it?
    - Did you see a response that made you think differently?
- Thank you for taking the time to reflect and share your thoughts scientists!

BELIEVE & Teacher Survey

Assistant Instructor Teaching Notes:

- € Help classroom teachers sign onto laptops so they can take the Teacher Survey.
- € Monitor students taking BELIEVE Survey.

Believe Survey - Students

- Have students sitting at tables.
- On the board, write today's date, the teacher's name, and the school as reference for students.
- Explain to students that they will be taking a brief survey. Use the following talking points:
    - Thank you for being great learners and scientists today. As we end today we'd like to learn a little bit more about how you think and feel about science. To do so, we'd like you to complete a simple survey.
    - This survey allows us to learn what you think and helps us build the best science experiences possible for you in the future. There are no right or wrong answers, we just want to know what you think. Your answers on this survey stay private, in fact your teacher never sees it, and this won't be graded.
    - It is 10 multiple choice statements. I'll read each one out loud and you'll color in the circle of the statement that best describes how you feel about it. Please stay with me, don't work ahead, and only answer the question I am currently reading out loud.
- Pass out surveys and pencils and have students fill in their information at the top.
- When students are ready, read each question and the answers out loud.
- After reading each question, give students approx. 30 seconds to choose their answer before moving on to the next question.
- When finished, collect all surveys.
- Paper clip together by class.
- Give completed surveys to Joel.

Teacher Survey

- Before each trip, prep 1 laptop per teacher that will be dedicated for survey use.
    - Ensure laptop has a charger.
    - Bookmark a link to the teacher survey on Chrome.
    - Store the laptop in the location of the Believe survey for that grade level (typically in a lab).
- Connect with the teacher and give a brief (30 second) intro to the survey.
    - "We would love to get your feedback on the whole unit. You will have about 15 minutes to fill out this survey and it asks you brief questions about your thoughts on the program. Please make sure to include your name, grade level, school, and the date. The

program manager may want to follow up with you on some of your responses. Thank you!"

- Set the teacher up at a table with the laptop. Help them log on (the computers should not require a password), open Chrome, and click the Bookmark for the survey.
- Give the teacher time to complete the survey.
- At the end of the survey, collect the laptop from the teacher and store it.

Clean-Up & Goodbye

Assistant Instructor Teaching Notes:

- Make sure students have their science notebooks.
- Walk around with garbage can to collect any trash.
- Take any students who need a bathroom break to the bathroom.
- Make sure students push in chairs.
- Walk with students to watershed plaza, do "Go Awesome!" and give them a high-five.

- Invite students back to Living Lab for upcoming opportunities.
    - (use Return to the Living Lab For… slide in PowerPoint.)
- Collect science notebooks and give them to classroom teacher.
- Look around you on table and floor – pick up any trash you see and push in chairs.
    - *Note: While clean-up is happening also do a quick bathroom break before student begin walk or get on buses*.
- Walk students to watershed plaza.
- Today, we tried new things, did science, and made new discoveries. Whenever we do that, we have an Ocean Discovery cheer to send us off. We say "Go Awesome!" and hi-five Odi on the way out. Say it with me on the count of 3. 1, 2, 3… "Go Awesome!!"
- Have staff line up next to Odi and high five students on their way out.

Departure

Buses or Walking students:

- Do a final count to make sure all students are present before boarding buses or walking back to school.

Walking students:

- Take hand-held stop signs.
- Don't forget car keys!

Busing students:

- **If bus is more than 10 minutes late- call bus dispatch.

Staff Clean Up

Trip Lead: Determine who will do each of the below activities. Check when complete.
As you are implementing field trips, you can reference/check off the items in each section, if necessary.

1 GENERAL ITEMS - IMMEDIATE

Take any cups in the "dirty" bin and run them through the dishwasher.

- Dry and put away.

Mop student bathrooms, take out trash and place "Caution Wet Floor" sign up.

2 WATERSHED PLAZA/DISCOVERY GALLERY

Return stop signs, walking maps, and completed rosters to transitional storage.
Check out teachers at reception using visitor screen.

3 COMMONS/OUTDOOR AMPITHERATER

Fold blankets and put back in bin and use hand cart to return to storage.

- Place bin with blankets on shelf in the wetsuit porch.
- No need to wash blankets unless there was a large spill. If this is the case, start the wash load with the blanket and notify the Floor Lead.

Use scissors to cut ziptie at bottom of zipline.

- Pile up zipline cord at the bottom of the wall of the SciTech lab, straight down from the top of the zipline.

Pick up any trash left behind by students.
Sweep trash and food waste.
Empty trash and replace bags.
Consolidate pots onto one shelf in Grow Zone.

- Water the pots if they look too dry.
- Press down the seeds if they look too loose.
- When done, cover with plastic board.

Close gate to Grow Zone.
Ensure rope fence is up.

4 ECO LAB & SCI-TECH LAB

Sort Rokenbok bins to ensure equal pieces per bin (especially wheels) (Eco Lab ONLY).

- Place lids on Rokenbok bins and return to cabinet.

Put away all supplies in designated storage location.
Turn off SmartBoard.

- Log out of Zoom
- Close PowerPoint and Videos

Return hand sanitizers and pencils to cabinet.

Put away laptop and charger into cabinet.

Throw away student post-its (keep any especially good ones ☺).

Return chart paper to cave in SciTech Lab.
Sweep tables, chairs, and floor (mop as necessary).
Close back doors if room will be empty.
Take out trash as necessary.

5 LIVING ROOF

Return all rocks to the planter beds.
Put away blue buckets into bin.
Put away extra pots, seeds, and spray bottles into supply bin.

- Pour any extra soil from pots back into orange bucket.

Place orange bucket on ground next to sink.
Empty watering cans and return to garden storage box.
Return supply bins to transitional storage.

6 GENERAL ITEMS – POST TRIP

Turn in completed rosters and waivers to Program Manager or Program Coordinator.
Turn in Believe surveys to collection box.
Debrief with Program Manager.

- Report any broken or missing supplies.
- Report any supplies with low inventory remaining.
- Share good student stories.
- Report any issues/coaching to avoid these in the future.

Do a final check of all areas to ensure everything is properly cleaned, put away, and reset for after school programming.

Rainy Day Plan

Floor Manager will determine when rainy day plans need to be utilized.

Additional supplies:

- Umbrellas (1 per 2 students)
- Umbrella receptacles (4)
- Canopies (6)
- Broom and pan (2 of each)

1 Pre-Arrival

Place "Caution Wet Floor" sign in the Ocean Discovery Gallery.

Place umbrella receptacles right inside the entrance to receive used umbrellas.

For Make a Difference Today station (during light rain):

- Set up two canopies in the courtyard near the end of the zipline.
- Set up four canopies on the Living Roof for planting seedlings and for waiting to zipline.

For Make a Difference Today station (during heavy rain)

- Bring all seedling planting materials into the Ecolab (students will plant but not zipline).
- Have umbrellas ready to take students out to Living Roof.

Place a broom and pan in each location where lunch will be eaten.

2 Arrival

Take out umbrellas and bring them to the bus stop. Place umbrellas in a bin and cover with a lid while waiting for the bus.

Greet students and teachers on bus:

- Tell students that there will be one umbrella per two students.
- Give each pair of students an umbrella as they step off the bus
- Have two staff members stationed at the entrance to the lab to take and close the umbrellas and place them in the receptacles.

Take students to their Introduction location and review Community Agreements.

Floor manager:

- Walk to both intro stations and take teachers aside and note any students absent on the roster.
- Sign cover sheet stating they've collected all waivers to the best of their ability.
- Take adult chaperones aside and discuss expectations for the day (see curriculum above).

3 MAKE A DIFFERENCE TOMORROW

When it's time for students to draw their ideas for a wetlands FRED the lead instructor can take half the class to the Ocean Alcove to spread out and work and the assistant instructor can stay in the lab and let the other half of the students spread out.

4 MAKE A DIFFERENCE TODAY

Light Rain:

- Students will plant seedlings under canopies on Living Roof.
- A second set of canopies will be set up in the courtyard area for receiving plants off the zipline.

Heavy rain:

- Students will plant seedlings in the Living Lab and will not zipline.
- Using umbrellas take students to the Living Roof, show them the plants their seedlings will become when they grow using the Living Roof garden.
- Walk students to the edge and have them look out into the canyon. Explain that they seedlings they planted will be kept at the Living Lab until they grow big enough to be planted in this canyon or another similar canyon in City Heights.
- Use additional time to do a more in depth debrief.

5 LUNCH

Student will eat in the location where they finish their first activity.
Make sure students clean-up trash and use broom and pan to sweep up before starting the next activity.

6 DEPARTURE

Hand each pair of students an umbrella to walk to the bus.
Have two staff members standing at the bus to take umbrellas, close them, and place them in the receptacle.
Bring umbrellas back to lab.

7 CLEAN UP – POST TRIP

See Clean Up Protocol above.
Open umbrellas and leave them out to dry in Ecolab and SciTech lab.

Activities for Extra Time

These are quick 5-10-minute activities to be used if a lesson ends early.

Quick Focus:

- Stand in a circle. Have student close their eyes and take three deep breaths. Ask students to name three things they hear/smell/feel.
- Stand in a circle. Have students keep eyes open and take three deep breaths. Ask students to be silent for 10 seconds and try to count as many different sounds as they can hear.

Sit/Sensory Spot:

- This activity is most ideal when done outdoors.
- Have students sit down silently and close their eyes for 1-2 minutes.
- Ask students to focus on one sense (hearing/smell/touch) during that time.
- When students open their eyes ask them to share what they smelled/heard/felt, etc. while their eyes were closed.
- Remind students that stopping to focus on one particular sense can allow them to notice things they would not normally.
- Extra: If time allows, have students sketch what they heard/smelled/felt in their science notebook before doing a pair-share.

Blobs and Lines:

- The idea is for students to listen to their teacher's prompts and organize themselves in a line (for example, in alphabetical order of last name) or in blobs according to something they have in common (birth month).
    - Examples of prompts:
        - Line up in chronological order of your birthdays
        - Line up in order of how many siblings you have
        - Gather with those who have the same color sneakers as you
        - Gather with those who have the same pets at home as you (dogs, cats, none)

Fish School Challenge:

- Almost like "Simon Says" but this involves movements with other people.
- Explain to the students each name and movements (listed below). As you call out the movement, those that did not find their "school of fish" are out of the game (encourage them to be your refs).
- Continue the calls until you have at least 2-3 students at the end.
- You can play 2-3 times and then have a student take lead and call out the names.
    - Movement Names
        - Remora: two people, one person is the remora and holds the shoulder of the other person ("the shark") with one hand
        - Barnacle: requires three people. Two people form a circle with their hands with the third person in the center, the person in the center wave their arms up acting as the "cirri"

- Chain corals: four people link arms together
- School of fish: five people form a conga line to follow one another

Charades/Pictionary/Taboo:

Charades:

- The instructor will whisper something for a student to act out without using any sounds. The rest of the students have to try and guess that the student is acting out.
- The student who guesses correctly can be the next "actor" to come up and try to act out a word given to them by the instructor.

Pictionary:

- Give students a word that they have to draw and their group will guess. Examples: fish, ocean, waves, sun, plankton, shark, whale, fishing, fins, fish egg, sea star, sea urchin, etc.

Taboo:

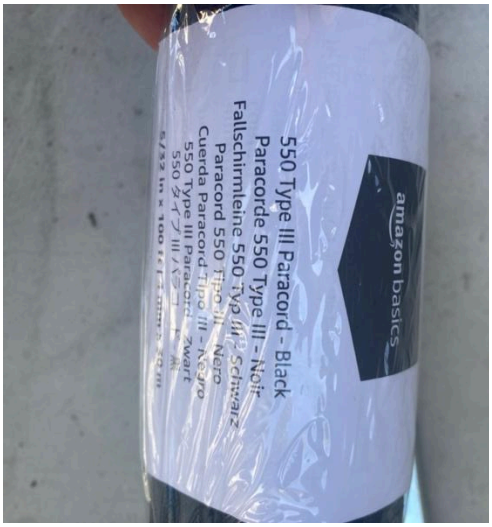
- Similar to Pictionary but the GROUP is given the word and they have to communicate hints to the "guesser."
- This can be done by having the "guesser" stand in front of the board and the teacher can write the word behind the guesser.
- You can continue down a list of words and see how many each group can get in 1 minute. See example list in Pictionary.

Idea Bank for Charades, Pictionary, and Taboo (ideas should ideally tie into the program):

- Wetlands
- Plant
- Restoration
- Biosphere
- Hydrosphere
- Geosphere
- Atmosphere
- Engineer
- Clapper rail
- Egret
- Hawk
- Watershed
- Exploring
- Question
- Scientist

Supplemental Materials: Zipline Set-up

Supplies:

- 150 feet Paracord – 550 Type III 5/32in x 150 ft
  - 

- Ratchet & #13 Ratchet attachment
- Adjustable wrench
- 2 bolts (thin enough to fit through holes of poles) – 3 inches in length, accompanied with 2 bolts and 2 washers to fit
- Pulley
- Tension hook



- 10 Zip ties
- Scissors (to cut zip ties)
- Sili-dry Silicone Spray
  - 

- 2 Square metal poles with holes (about 4 feet in height) – Otherwise known as perforated square metal rods



Steps to Set-up Zipline:

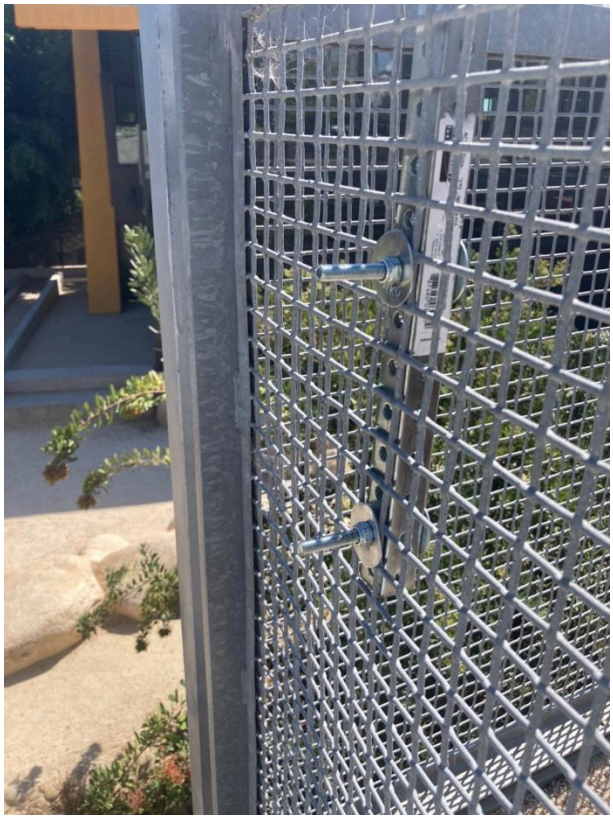
1. Gather all supplies
2. Position the pole (the one with the pulley attached) to the gate on the Living Roof



3. Slide in the bolts through the pole and gate (one towards the bottom of the pole and one towards the top)



4. Secure the bolt with the washer and tighten the nut. To tighten the nut you will need to hold the bolt with the adjustable wrench and then tighten the nut with the ratchet



5. Feed the cord through the pulley to stretch and measure it to the desired end
6. Pull and hold the cord taut to mimic how the zip line will run. Cut off the excess cord
7. Remove the cord from pulley
8. Decide which cement pole you want to secure the square poles to and weave through about 5 zip ties to hold

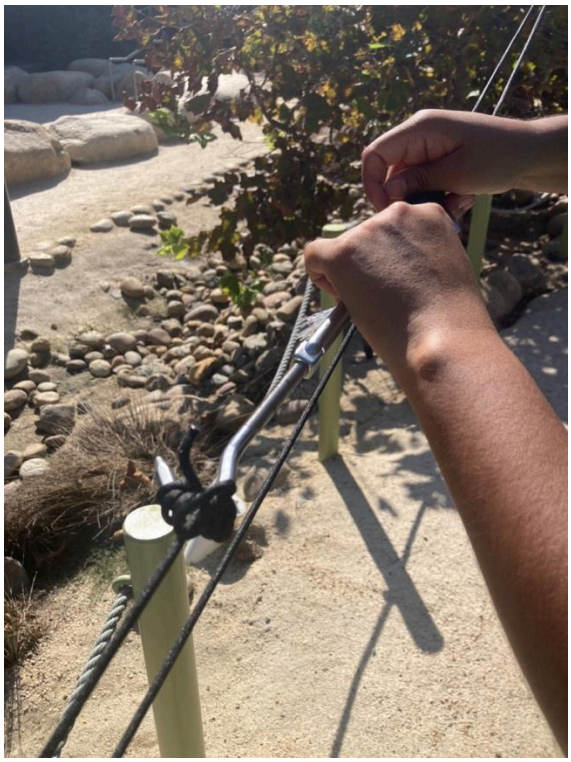


9. Zip tie the other pulley wheel toward the top of the pole (using two zip ties to position it facing the other pulley)



10. Spray the entire length of the cord with sili-dry to lubricate
11. Run the cord through the pulleys so that the ends are position on the top running cord. Make sure that the cord is not getting crossed (i.e. the cord runs from the top of one pulley to the top of the other)

12. Screw the tension hook to move out the hooks as much as possible
13. Tie each end of the cord to the tension hook (tension hook should sit on the top cord of the pulley system)



14. Rotate the hooks to slowly move in the bolts and create tension in the cord



15. Test the zip line!

Instructor Background Material