3rd Grade Curriculum

Platform: Rocky Seashore

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3rd Grade Curriculum

Overview

Ocean Discovery Unit

Guiding Concept: Students learn the importance of the rocky seashore ecosystem, explore how animals and humans utilize this ecosystem, and learn how they can help protect the rocky seashore today and in the future.

Science Discovery Process Focus:

- Make a Difference
- Explore and Wonder
- Investigate

NGSS Alignment

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.

Overarching Responsibilities of Team Lead:

- 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 Team Leads:

- During 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.

3rd Grade Story

Internal – Staff and Teachers

Students learn the importance of the rocky seashore ecosystem, explore how animals and humans utilize this ecosystem, and learn how they can help protect the rocky seashore today and in the future.

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

During Explore Day at La Jolla Cove, students investigate a real rocky seashore and use scientific tools to analyze how 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 the rocky seashore today and in the future. Students learn how their community is connected to the rocky seashore through the watershed and work to protect this habitat by picking up trash that will eventually end up at the rocky seashore and harm the animals that live there. Students learn about a future career opportunity by becoming ecologists and exploring the many ways animals are adapted to life at the rocky seashore. Students also meet a science leader 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 ecologists, exploring the rocky seashore, using scientific tools, getting to know science leaders, and making a difference in the world!

3rd Grade Story
External – Students

I am excited to continue my journey with Ocean Discovery Institute in 3rd grade by learning more about the rocky seashore I started exploring in Kindergarten. Over the years, Ocean Discovery has helped me believe that science is something I can do and a science leader is someone I can become.

On our first day, we meet the Ocean Discovery staff when they come to our classroom. We build bracelets that show we are all science leaders but also unique individuals – I understand now that having people from different backgrounds become science leaders is important so there are always new ideas. We also learn what the environment at the rocky seashore is like and discover different animals that live in and around the rocky seashore. It's really cool that all those rocks provide a place for so many animals to live!

I am so excited when we get to visit La Jolla and see a real rocky seashore! We explore the tidepools all morning and find tons of cool animals – sea anemones, hermit crabs, and limpets, to name a few. We observe how these animals interact with the rocks, waves, and other animals at the rocky seashore. We even walk down the beach to investigate a storm drain and consider how humans interact with the rocky seashore – I would never have thought that water from my neighborhood could make it here to the rocky seashore!

On our last day, we go to the Living Lab to learn how to use all our knowledge to make a difference. We become ecologists and investigate how animals are adapted to life at the rocky seashore. We make our own animals out of clay, then the teacher makes a wave with a bucket of water and – SPLASH! – some of the animals survive and some don't! We also see more living rocky seashore animals up close, like snails, brittle stars, and sea slugs! I didn't know that some science leaders observe and study animals as a job – so cool! During one of my favorite parts of the day we help protect the rocky seashore by walking in the canyon and picking up trash that could eventually get washed into storm drains and down to the ocean and hurt the animals that live at the rocky seashore. It makes me feel good to help keep those animals safe! Before lunch, we meet a science leader who tells us about how they got to be a science leader and lets us ask questions about their job. They even talk about times they felt challenged and how they got through those tough times – who knew that science leaders sometimes face challenges like me? It gets me thinking that I might want to be a science leader someday.

I had so much fun, did so much science, and learned so much. I can't wait to be a part of Ocean Discovery in 4th grade!

Community Building Day

In-School Experience

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

Supplies:

- 3rd Grade Community Building Day PowerPoint from teacher portal
- Rocky Seashore Video
- Rocky Seashore Poster
- High Tide Low Tide poster
- Science Discovery Process Poster
- Chart paper
- Sharpies (3)
- Color pencils or crayons
    - 4 colors: dark blue, turquoise (light blue), orange, yellow. 20-24 of each color.
- Discovery Fish print out (1 per student)
- 3rd Grade Bracelet Questions (laminated) (1)
- Rocky Seashore Search and Find (laminated) (1/student)

Timing:

Time	Activity	Learning Cycle
0:00 – 0:15	Introductions & Discovery Fishes Intro	Engagement
0:15 – 0:25	Rocky Seashore Intro	Exploration
0:25 – 0:40	Search and Find – Rocky Seashore	Guided Analysis
0:40 – 0:50	Finish Discovery Fishes	
0:50 – 1:00	Self-Reflection	Reflection

Team Lead 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.).

Set Up:

- € Cue up 3rd Grade Community Building Day PowerPoint from teacher portal -OR- bring all visuals to front of classroom:
  - O Science Discovery Process poster
  - O Rocky Seashore poster
  - O High Tide/Low Tide poster
  - O Rocky Seashore Video (need connection to the internet):
    - https://www.nps.gov/subjects/oceans/rocky-shores.htm
    - Skip ads and pause video
- € Check that external video sources are enabled to play the video of the Rocky Seashore (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 "Rocky Seashore" 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 Team Lead Teaching Notes:

- € During 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 Fishes Intro

Introductions:

- All staff take 30 seconds to introduce themselves and share their story.
- Introduce Ocean Discovery Institute.
    - Give a very brief overview of the program (3 days, 1 class visit, 1 exploration day, etc.).
    - Some students have had Ocean Discovery since Kindergarten and for some students it's their first year.
- Introduce the concept of being a science leader with Ocean Discovery Institute:
    - When you work with Ocean Discovery – you are a science leader.

Community Agreements:

- As science leaders 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.

Science Discovery Process

- Science leaders do many things – all of them are included in the Science Discovery Process.
    - (Show Science Discovery Process slide.)
    - This is the process science leaders use to do science!
        - The Science Discovery Process is a cycle.
        - Make a Difference is at the center because science leaders want to make the world a better place.
- Go through each part of the Science Discovery Process and provide a brief explanation.
    - Explore and Wonder:
        - Science leaders take time to explore a wonder about the world, they do this by asking questions and making observations using their senses of seeing, hearing, touching, tasting, and smelling.
    - Investigate:

        - Those questions and observations lead to ideas that science leaders want to test, so they design investigations and gather evidence.
    - Analyze:
        - Once science leaders have gathered lots of evidence, they look for patterns and try to explain what they see – this is called analyzing.
    - Communicate:
        - Science leaders know it is essential to share what they learn with other people, so they spend time sharing what they learn in many ways – this is communicating.
    - Make a Difference:
        - Through the Science Discovery Process, science leaders often learn new things about the world that can be used to make a difference.
        - Once science leaders have learned something new, it often leads them to other questions and ideas, so the cycle begins again! Science leaders are always working on some part of the Science Discovery Process!

Discovery Fishes Intro

- Throughout class today, you will be making a Discovery Fish that represents YOU as a science leader.
- To make a discovery fish, you will answer a series of questions about yourself, depending on your answer, you will color a scale particular color on your fish.
    - 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 color the #1 scale orange (demonstrate) and if you would rather dive to the bottom of the ocean, you will color the #1 scale a dark blue on your fish.
    - Once you've colored the scale on your fish, you can talk to the person next to you and tell them which color you chose and why you chose it, and you can ask them about which color they chose and why.
- (Pass our the Discovery fish and 4 of each color pencil / crayon at each table)
    - (Repeat the question and ask students to choose an orange or dark blue color and color the #1 scale).

Discovery t Activity

- Ask 2-3 more questions:
    - Would you rather be able to fly like a hawk /or/ swim like a dolphin?
    - As a science leader would you rather study plants and animals on land /or/ plants and animals in the water?
    - Would you rather study the properties of water in the ocean /or/ the properties of soil that make up the Earth?

Discovery Fish Debrief

- (Have students hold their fishes 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 fish 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.
            - (Add "unique" to the world wall.)
        - Each of you is, one of a kind, so each fish 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 coloring our fish 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 colors at the center of their tables.)

Rocky Seashore Intro:

Introduce Rocky Seashore:

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

Kindergarten vs. 3rd Grade

Starting in 24-25 school year, students will have learned about the rocky seashore with Ocean Discovery in Kindergarten.

- Remind students who worked with Ocean Discovery in the past, that they explored the rocky seashore in Kindergarten.
- This year we will learn even more about the rocky seashore.

Potential Questions:

- *Does anyone remember exploring the kelp forest with Ocean Discovery in Kindergarten?*
- *Does anyone remember what the environment is like at the rocky seashore?*
- *Does anyone remember what kinds of plants and animals live at the rocky seashore?*

- This year we will dive further into the rocky seashore – investigating and analyzing how animals and humans interact with rocky seashore and how we can help protect the rocky seashore today and in the future.
- Okay Science Leaders! It is time to **Explore and Wonder**!
  - (Point to Science Discovery Process poster.)
  - In a moment we will watch a video of the rocky seashore. While you watch, make observations about what you see and think about questions you have about the rocky seashore.
- Let's see what it's like at the rocky seashore!
  - (Play Rocky Seashore video/poster.)
  - (Show Rocky Seashore slide/poster.)
  - Have students look at the rocky seashore slide/poster and ask:
    - What questions do you have?
    - What did you observe?
    - What do you think it would be like live at the rocky seashore?
- Define Rocky Seashore:
  - (Use the board/chart paper.)
  - Definition of a rocky seashore:
    - rocky – a place with rocks
    - seashore – a place where land and ocean meet

- rocky seashore = a rocky place where the land and ocean meet.

<u>Introduce High and Low Tide:</u>

- At the rocky seashore there is a time of day when more of the rocks are covered with water and a time where less of the rocks are covered with water.
  - (Show High Tide/Low Tide slide/poster.)
- High tide and low tide.
  - High tide- when the water is at its highest height
  - Low tide- when the water is at its lowest height
  - Show high tide/low tide visual.
- High tide/low tide "dance".
  - All students stand up.
  - Team Lead puts arms straight out to sides while standing on tip toes and says in a high squeaky voice "High tide!"
  - Team Lead keeps arms out to sides but crouches way down and says in deep low voice "Low tide!"
  - Have students repeat several times or do a quick game of Simon Says.

<u>Introduce Tidepools:</u>

- When tides are low you often get tidepools.
  - (Point out tidepools in Low Tide picture.)
- Break down the word "tidepool" with students.
  - Underline the word <u>tide</u> and ask what are tides? (rising and falling of the ocean)
  - Underline <u>pool</u> and ask what is a pool? (a body of standing water)
  - Definition - *a body of saltwater that is left behind when the tide goes out.*
- Tidepools are a place where many animals like to live!

Search & Find – Rocky Seashore

Assistant Team Lead Teaching Notes:

- € Help pass out Rocky Seashore 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.

<u>Introduce Search and Find Drawing</u>

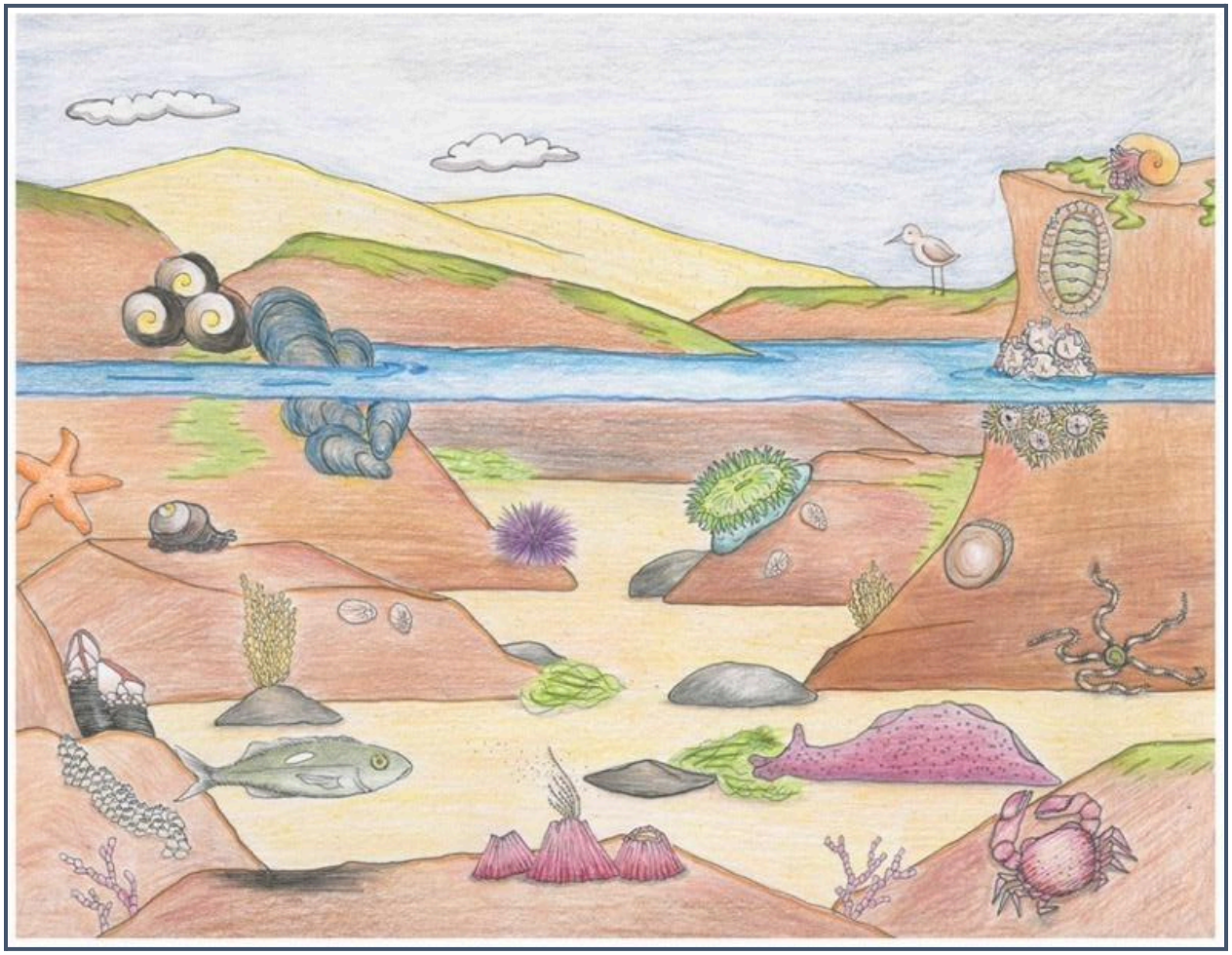
- Okay, Science leaders, it's time to investigate the rocky seashore!
  - (Point to Investigate on Science Discovery Process poster.)
- We are going to look at a drawing of a rocky seashore today and in a few days, you will visit a real rocky seashore with Ocean Discovery.
  - (Pass out Rocky Seashore Search and Find drawings).
  - Give a minute for a "wow moment" and allow students to explore it.
- Orient students to the rocky seashore drawing.
  - (Show Rocky Seashore Search and Find Drawing slide.)
  - Point out the waterline and what is above and below the water.
- Ask students to make observations about the rocky seashore.
  - Write their observations down on a piece of chart paper.
  - Science leaders often write down or draw their ideas, observations, and questions so they can investigate them later.

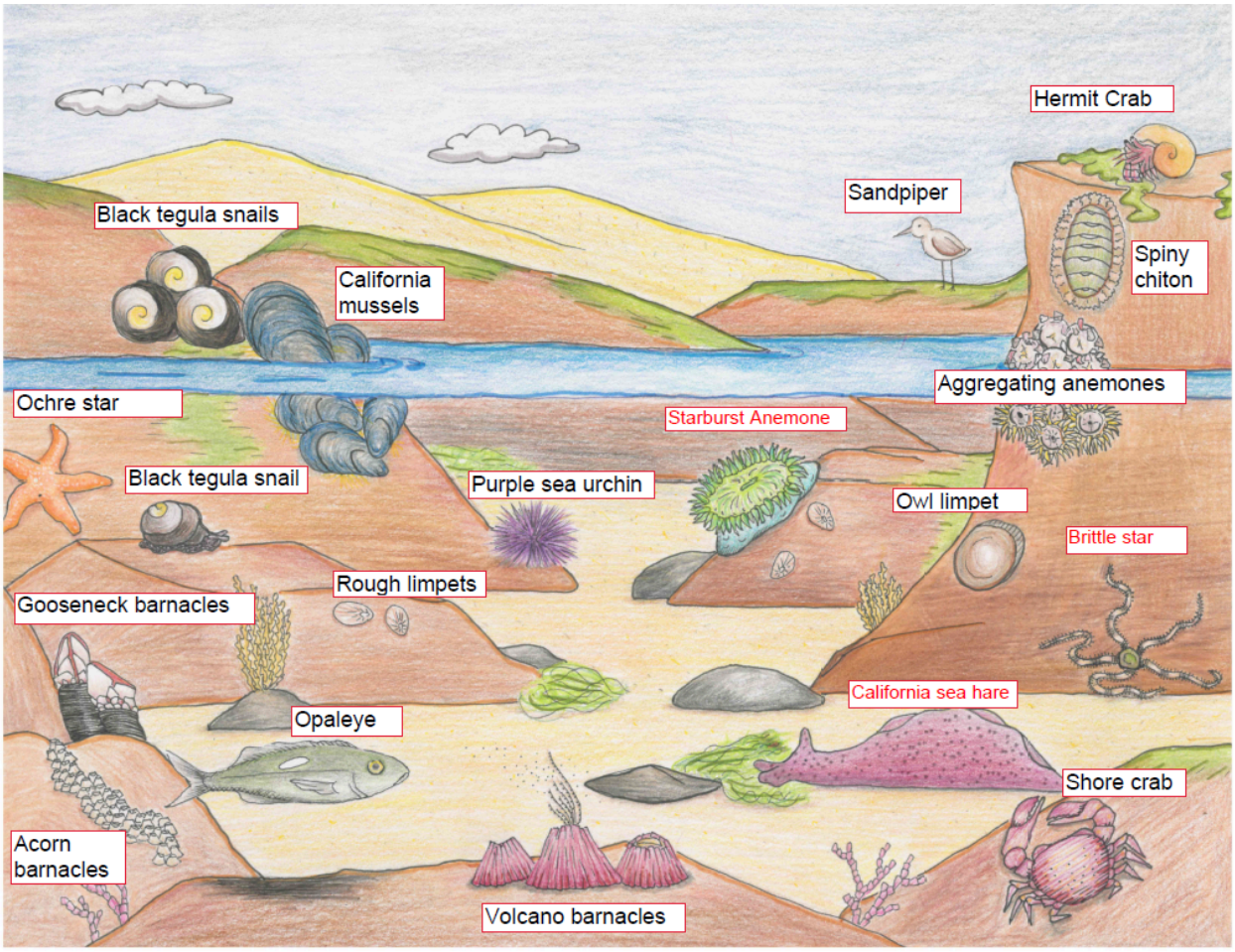
<u>Introduce Bingo</u>

- (Project Rocky Seashore Bingo Card 1 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.
  - Demonstrate 1-2 examples.
    - Ex. I see an animal with a shell – point to hermit crab on Rocky Seashore Search and Find Drawing. I will put an "x" over that square on my Bingo card.
- 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 Rocky Seashore Search and Find drawings.)

Debrief Search and Find

- Ask students to name some of the animals they saw in their rocky seashore drawing.
    - Lots of unique animals live at the rocky seashore.
    - Science leaders refer to this as a diverse ecosystem.
    - Define diversity: variety, lots of different things.
    - Diverse ecosystems are healthy ecosystems. Science leaders like to see healthy ecosystems.





Finish Discovery Fishes

Assistant Team Lead 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 fishes and put them on.

- Have students pick up their fishes again..
- Ask as many questions as time allows:
  - As a science leader, would you rather investigate small animals that live in the cracks in the rocks of the rocky seashore /or/ larger animals that live in the tidepools?

- As a science leader, would you rather study birds that visit the rocky seashore /or/ study fish that swim along the edge of the rocky seashore?
- As a science leader, would you rather design a miniature submarine to explore tidepools/or/ design a robotic surfboard to study the animals that live in the waves at the rocky seashore?
- As a science leader with Ocean Discovery, are you more excited to talk to real science leaders /or/ to learn how to protect the rocky seashore?
- As a science leader, would you rather draw your ideas with pen and paper /or/ build your ideas with tools?
- As a science leader, would you rather work with microscopes and DNA to understand how the human body works /or/ use telescopes and computers to study outer space?
- As a science leader, would you rather work to help protect endangered animals or work to prevent climate change?

- We are all science leaders working with Ocean Discovery so let's all put one dark blue as the last scale.
  - (Have every student put a final dark blue scale on their fish.)

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 fishes:
    - For example, let's reflect on our discovery fishes. Some people might simply think they are simply pretty fish but we know they mean more than that.
    - Belonging.
        - Everyone has an ODI fish and everyone's fish has a dark blue scale at the end of the t = belonging to a community of science leaders.
    - Uniqueness.
        - Point out that everyone's fish has different color scales 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:

- Excellent work today science leaders!
    - You have learned about what kelp is and some of the animals that live in the tide pools.

- Please share your Discovery Fish and everything you learned about the tide pools with your friends and families tonight.

- Remind students that they will visit a real tide pool with Ocean Discovery to continue on ____ date.
  - **REMINDER TO STUDENTS**: Do not bring personal backpacks on Ocean Discovery Field Trip. We will provide a backpack to carry your lunch and your scientific tools.
- At Ocean Discovery Institute we:
  - (Show Believe! Achieve! Lead! slide.)
  - BELIEVE that science is something each of you can do and a science leader is someone you can be, that you can
  - ACHIEVE in science and think critically about our world, and you can
  - LEAD in science and make a difference in the world.
- Because we believe this about all of you, 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 team lead.*
- *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.*

ROCKY SEASHORE BINGO CARDS

An animal that is out of the water	An animal with a shell	An animal that stays in the same place
An animal with spines	An algae	An animal that can stick to rocks
A fish	An animal that grows with its shell	An animal with claws

An animal in the water	An invertebrate (animal without a backbone)	An animal you do not recognize
An animal that can swim	An animal with 5 arms	An animal with a soft body
An animal that can leave its shell	An animal you know the name of	An animal with 2 h

An animal that can molt	An animal with tentacles	An animal with 1 shell
An animal with a round body	An animal that must stay in the water	An animal with tube feet
An animal that cannot swim	A vertebrate (animal with a backbone)	An animal that moves very slowly

Exploration Day

Coastal Field Experience

Goal: Students build belief that they can recognize and do science while investigating how animals and humans interact with the water, rocks, and other animals at the rocky seashore.

Location: La Jolla Cove area (see map)

Supplies:

- Ocean Discovery Institute Field Trip Volunteer Card print out (1/adult volunteer)
- Cover sheet (1/class)
- Bandanas (1/student + 1 adult)
    - 4 colors (1 color/group)
- Water jug (2)
- Throw-Rings (1/lead team lead)
- Orange cones or Home depot buckets (4/team lead)
    - To be used as boundary markers by tidepools.
- Explorer Backpacks (1/student)
    - Binoculars
    - Hand lens
    - Rocky Seashore Animal ID Card
        - Papi//Curriculum/SI New/Upper Elementary (3-5)/3rd Grade/Explore Day Visuals
    - Pencil
    - Science Notebook
- Team Lead backpacks (1/team lead)
    - First Aid kit
    - Science Discovery Process Mini Poster (18 x 11”)
    - Clipboard with large laminated “STOP” sign taped to back
    - Example Science Notebook
        - To be used for demonstrations
    - Mini white boards
    - Dry erase markers (2)
    - Dry erase eraser (1)
    - Small aquaria w/ lid (2)
    - Black trash bags (1)
    - Bottle of hand sanitizer (1)
    - ½ sheet of blank paper (1/student + 1/adult)
    - Stopwatch (1)
    - Large towel (1)
- Ziploc Bags (1/class)
    - To store student science notebooks to be returned on Living Lab Day

3rd Grade Explore Timing

Low Tide is Early

On Time:

Time	Group 1	Group 2	Group 3
9:30 – 9:50AM	Arrival & Walk to Introduction Station		
9:50 – 10:10AM	Introduction		
10:10 – 11:15AM	Animals & the Rocky Seashore		
11:15 – 11:35AM	Lunch		
11:35 – 12:15PM	Humans & the Rocky Seashore		
12:15 – 12:35PM	Self-Reflection		
12:35 – 12:40PM	Clean up		
12:40 – 1:00PM	Walk to Buses + Goodbye		

Late Start School/A Little Late: *5 minutes less time at this station

Time	Group 1	Group 2	Group 3
9:45 – 10:05AM	Arrival & Walk to Introduction Station		
10:05 – 10:20AM*	Introduction		
10:20 – 11:20AM*	Animals & the Rocky Seashore		
11:20 – 11:40AM	Lunch		
11:40 – 12:20PM	Humans & the Rocky Seashore		
12:20 – 12:40PM	Self-Reflection		
12:40 – 12:45PM	Clean up		
12:45 – 1:00PM*	Walk to Buses + Goodbye		

A Lot Late: *5 minutes less time at this station

Time	Group 1	Group 2	Group 3
10:00 – 10:20AM	Arrival & Walk to Introduction Station		
10:20 – 10:35AM*	Introduction		
10:35 – 11:35AM*	Animals & the Rocky Seashore		
11:35 – 11:50AM*	Lunch		
11:50 – 12:30PM	Humans & the Rocky Seashore		
12:30 – 12:45PM*	Self-Reflection		
N/A	Clean up		
12:45 – 1:00PM*	Walk to Buses + Goodbye		

Low Tide is Late

On Time:

Time	Group 1	Group 2	Group 3
9:30 – 9:50AM	Arrival & Walk to Introduction Station		
9:50 – 10:10AM	Introduction		
10:10 – 10:50AM	Humans & the Rocky Seashore		
10:50– 11:10AM	Lunch		
11:10 – 12:15PM	Animals & the Rocky Seashore		
12:15 – 12:35PM	Self-Reflection		
12:35 – 12:40PM	Clean up		
12:40 – 1:00PM	Walk to Buses + Goodbye		

Late Start School/A Little Late: *5 minutes less time at this station

Time	Group 1	Group 2	Group 3
9:45 – 10:05AM	Arrival & Walk to Introduction Station		
10:05 – 10:20AM*	Introduction		
10:20 – 11:00AM*	Humans & the Rocky Seashore		
11:00 – 11:20AM	Lunch		
11:20 – 12:20PM	Animals & the Rocky Seashore		
12:20 – 12:40PM	Self-Reflection		
12:40 – 12:45PM	Clean up		
12:45 – 1:00PM*	Walk to Buses + Goodbye		

A Lot Late: *5 minutes less time at this station

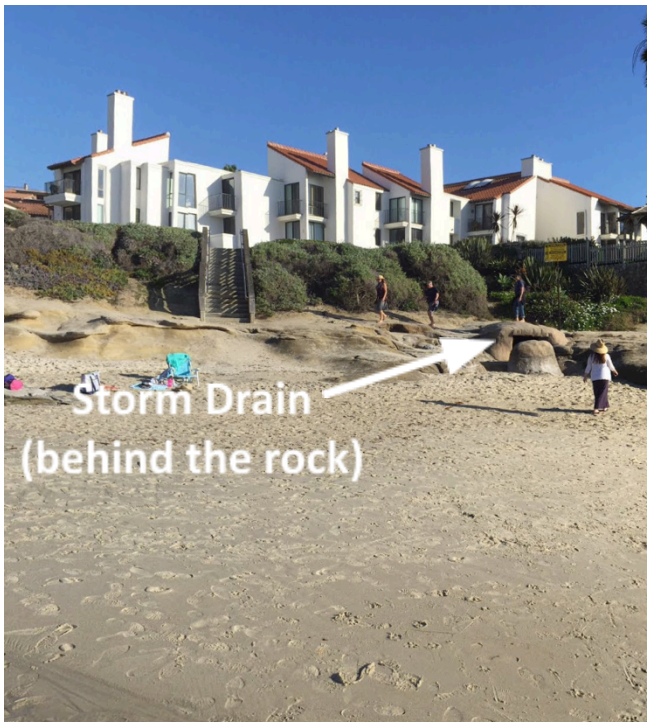
Time	Group 1	Group 2	Group 3
10:00 – 10:20AM	Arrival & Walk to Introduction Station		
10:20 – 10:35AM*	Introduction		
10:35 – 11:15AM*	Humans & the Rocky Seashore		
11:15 – 11:30AM*	Lunch		
11:30 – 12:30PM	Animals & the Rocky Seashore		
12:30 – 12:45PM*	Self-Reflection		
N/A	Clean up		
12:45 – 1:00PM*	Walk to Buses + Goodbye		


Animals & the Rocky Seashore
Grassy Area for Intro
Stairs to Tidepools
Humans & the Rocky Seashore
Tidepooling
Google

Close-Up Humans & Rocky Seashore



Storm Drain #1



Storm Drain #2


Storm Drain

Arrival

Program Set Up:

- € At the lab:
  - O Fill student water bottles (~5 per group more students bring personal bottles now)
  - O Fill water jugs
- € Introduction area:
  - O Have each Team Lead choose a location in the grass to do their introduction. Be sure groups are spread out enough to not interfere with one another. At each of these locations:
    - ▪ Set up 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.
    - ▪ Set out bandanas (1/student+ 1/adult)
  - O Set out a few water bottles at each intro spot
- € Place water jugs in the intro area to be used for refills throughout the day
- € Have all team leads choose an area of the rocky seashore and a storm drain area where they will take their group today.
  - O The goal is for groups to spread out so that team leads can monitor safety and easily count their students at all times.
  - O Be aware of areas that are particularly slippery and avoid these (green slick, etc.).
- € Determine who will take on which of the below Arrival responsibilities.
- € Determine what your groups name will be: color + animal.
  - O Ex. Blue Egrets, Green Sharks, Purple Hermit Crabs, etc.

- **BUS DROP OFF LOCATION:** Corner of Jenner and Coast.
- (Trip Lead: Meet buses at La Jolla Cove bus stop, introduce yourself to teachers and bus driver.)
  - Welcome students to La Jolla Cove.
  - o Confirm with teachers that all chaperones know which group they are working with.

- (Begin Arrival Tasks.)
  - (Note: The below should take place simultaneously.)
  - o Trip Lead (1)
    - ▪ Dismiss all chaperones on the bus to meet with the team lead 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.
    - ▪ Confirm with Assistant Team Lead #1 that lunches are ready to be passed out to students as they unload.
      - Explain to students that they will each be handed a lunch as they exit the bus which they will carry to their introduction area and then place in a backpack provided by Ocean Discovery Institute.

- Unload students by class.
    - Each class = 1 group

- Assistant Team Leads (1-2)
    - 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.
    - Stand outside each bus to pass out lunches to students as they disembark.

- Team Lead (1)
    - Conduct **Chaperone Introduction** to discuss expectations for the day.
    - Provide each chaperone 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!
            - 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 team lead is talking.
        - Have fun!
    - Dismiss all chaperones to join their groups.

- Team Leads & Assistant Team Leads
    - Meet students in their group as they get off the bus.
    - As soon as your group is ready, walk students to bathroom for a quick bathroom break and then walk to your Introduction area and begin.
        - Stand at street crossings, use STOP sign on back of your clipboard to direct students when to cross.
    -

Introduction

Assistant Team Lead 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 to La Jolla Cove:

- Welcome to La Jolla Cove Science Leaders!
  - We are in La Jolla to the north and west of City Heights.
  - La Jolla is only a 25-minute car ride or hour-long bus ride from City Heights.
  - Everywhere we will visit today is open to the public which means you can return on your own with friends and family at any time.

Review Community Agreements:

- As science leaders we all need to Be Our Best Self.
  - (Show Community Agreements)
- To Be Your Best Self, you should:
  - **Be curious!**
    - Ask questions, make observations, and share your thoughts and ideas.
  - **Be respectful!**
    - Of each other, of adults, of the environment.
  - **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.

Review Science Discovery Process:

- As Science Leaders we will be using the Science Discovery Process.
  - Ask students what they recall about the Science Discovery Process.
- Review Science Discovery Process.
  - (Show Science Discovery Process Mini Poster.)
  - Be sure to cover:

- This is the process science leaders use to do science!
- The Science Discovery Process is a cycle.
- Make a Difference is at the center.
- Explore and Wonder:
  - Science leaders use their sense to ask questions and make observations.
- Investigate:
  - Science leaders design investigations and gather evidence.
- Analyze:
  - Science leaders look for patterns in their evidence and try to explain what they see.
- Communicate:
  - Science leaders share what they learn with other people.
- Make a Difference:
  - Science leaders often learn new things about the world that can be used to make a difference.

Preview the Day's Theme:

- Today we will be focused on the "Explore and Wonder" and "Investigate" parts of the rocky seashore.
  - (Point to these bubbles on the Science Discovery Process Mini Poster.)
- Our focus will be on investigating how animals and humans interact with the water, rocks, and other animals here at the rocky seashore.

Review Rocky Seashore:

- Define rocky seashore = a rocky place where the land and ocean meet.
  - Ask students to name some of the animals that live at the rocky seashore.
    - You can remind them of their classroom rocky seashore if they struggle.
- Remind students that the tide changes daily at the rocky seashore and that there is a high tide and a low tide.
  - Have students do kinesthetic movements for high tide and low tide.
  - (*See Community Building Day – Rocky Seashore Intro for movements*.)
  - Ask students if they think it is high tide or low tide right now? Why?
- Review tidepools.
  - Define tidepool: a body of saltwater that is left behind when the tide goes out.
  - Ask students when you get more tidepools during high or low tide? – Low tide.

Introduce Science Notebooks & Explorer Backpacks:

- To Explore and Investigate, science leaders need tools and a place to write their observations and ideas.
- Each backpack has a science notebook.
  - Science leaders 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.
  - Take time to review the use of the hand lens.
  - Remind students that we use all tools respectfully.
  - Anyone using their hand lens to burn or "scrape" at the rocks or animals will lose the privilege of using the hand lens.
- 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:

- Science leaders 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 science leaders.
- 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.)

Animals & the Rocky Seashore

Assistant Team Lead Teaching Notes:

- Take half the group to Explore the tidepools.
  - See "Rocky Seashore Exploration Management" in curriculum below.
- When looking in tidepool ask students questions. Potential questions include:
  - What do you notice about the animals?
  - How do the animals interact with the water? Rocks? Other animals?
  - What questions do you have?
  - What observations have you made?
- Remind/help students to use the tools in their backpack.
- Make sure students remain within the boundaries and are begin safe at all times.

Location: Animals & the Rocky Seashore (see map)

Timing for this station:

- Intro (10 min)
- Walk to/from tidepools (10 min)
- Exploration (25 min)
- Process Reflection (20 min)

Intro:

- At this station you will investigate - **How do animals interact with water, rocks, and other animals at the rocky seashore?**
  - Your job is to find animals, make observations, and ask questions.
- Review the Rocky Seashore Animal ID Card.
  - (Have all students take the card out of their Explorer backpacks and look at it.)
  - These are some of the animals you might find in and around the tidepools.
- Review the Five Rules of Rocky Seashore Exploration.
  - Introduce the five rules of exploring the rocky seashore.
    - No running
    - No jumping
    - No pushing
    - Stay in boundaries
    - Be gentle with animals
  - Have students repeat each rule back to our out loud.
  - Explain to students that anyone who breaks one of the five rules will receive a 5-minute time out from exploring.
- Clarify the final rule: Be gentle with animals:
  - Use only two fingers to touch.
  - Wet your hand before touching any animal.
  - Touch gently without poking.
  - If you want to pick up an animal pull GENTLY. If the animal doesn't come loose, leave it where it is and observe it from there.
  - When you are finished looking at an animal return it to the location you found it.

- Review Community Agreements
    - *o* Be your best self!
        - **Be curious!**
            - When you find an animal -take a few moments to observe it before touching it. Things you might want to notice:
                - *o* What is the animal doing?
                - *o* Is the animal in or out of the water?
                - *o* Is the animal using the rocks in anyway?
                - *o* How is the animal reacting to other animals?
            - Don't forget to utilize any tools you would like from your explorer backpack.
        - **Be respectful!**
            - Share your findings with other science leaders around you.
            - Listen to any adults that give you directions.
            - We must leave everything we find here at the rocky seashore – including empty shells and rocks. These are the things that animals make their homes from, and as science leaders we want to observe but leave these items behind.
        - **Be safe!**
            - Abide by the Five Rules of Rocky Seashore Exploration at all times.
            - We will move around together as a group – so stick close by but feel free to look around at different tidepools when we stop.
            - We will be moving slowly and stopping and crouching down often. If you really want to find things that live in the tidepools it's helpful if you move slowly and look closely.
            - Stay away from the waves. Waves come in many different sizes so don't be surprised by a wave – always be watching!
            - When I need to get your attention, I will use our team name.
                - *o* (Practice call and response with students- make sure they get LOUD!)
                - *o* (Ex. Team Lead: "Blue!" Students "Egrets!")

<u>Walk to Tidepools</u>

- Have students take Explorer Backpacks and put them on.
- Use the staircase to access the tidepools.
- Place cones out to show boundaries for students.
- Review Five Rules of Rocky Seashore Exploration.
    - o No running
    - o No jumping
    - o No pushing
    - o Stay in boundaries
    - o Be gentle with animals

Rocky Seashore Exploration Management

Exploration

- Enforce Five Rules of Rocky Seashore Exploration.
  - When necessary, give a 5-minute timeout to anyone not abiding by the five rules.
- Exploring the rocky seashore works best when it's an instructor-guided group exploration. Ideally you want the students close together & huddled with you.
- Point out animals and encourage students to observe & touch.
  - Ramp up the excitement – "LOOK AT THIS HERMIT CRAB!! WHO WANTS TO TOUCH THE ANEMONE?!"
  - Be sure to replace any rocks that you turn over.

Exploration Weather: Calm

- Split the group in half.
  - Team Lead will take half the students.
  - Assistant Team Lead + Classroom teacher will take the other half of the students.

Exploration Weather: Rough

- Team Lead will walk students around to explore tidepools together.
- Assistant Team Lead will focus on "herding" – making sure all students respect boundaries and are being safe.
- Consider ending the exploration early if conditions are so bad that it feels unsafe.

Exploration:

- Explore as a group with students.
- Ask students questions as they make observations. Potential questions:
  - What animal have you found?
    - Encourage students to use Rocky Seashore Animal ID Card to identify animals.
  - What do you notice about this animal?
  - How does this animal interact with the water? Rocks? Other animals?
  - What questions do you have about is animal?
- After students make observations and ask questions, share fun/interesting facts about animals that you are looking at (see instructor supplement for info).

Process Reflection:

- Investigate an animal intro:
  - It is now time to investigate a single animal at the rocky seashore.
    - Everyone will spread out and find a single animal they want to observe closely.
    - It can be an animal you looked at before or a new animal.
  - You will have approximately five minutes to:
    - (Show students the page they will be working on in their science notebook w/ an already done example.)
    - Observe your animal.

- Draw your animal.
- Write down: one way your animal is interacting with the water, the rocks or other animals.

- Have all students open their science notebooks to "Animals at the Rocky Seashore" page.
  - Review boundaries for sitting.
  - Remind students to Be Their Best Self.
    - Be respectful. If another science leader has chosen an animal to observe, go and find another animal.
    - Be safe: Stay within the boundaries.
    - Be curious: Make lots of observations about your animal.

- Investigate an Animal:
  - Give students time to spread out.
  - (Give students five minutes to work.)
  - (Give students a two and one-minute warning.)
  - (Walk up to grassy area to do Investigate an Animal Debrief.)

- Investigate an Animal Debrief:
  - *Instructor note: Focus this conversation on the NGGS Cross Cutting Concept: Systems and System Models. Animals at the rocky seashore interact with the physical environment (i.e. rocks, waves, etc. and other animals).*

  - Ask students to share what animal they drew and what ways that animal was interacting with the water, rocks, or other animals?
    - Ask students follow up questions to their response in order to get to the idea of how/why animals interact with the physical and biological environments.
      - Teacher – What animal did you observe?
      - Student – Anemone.
      - Teacher – Can you tell me an observation you made about the anemone?
      - Student – The anemone was using a rock.
      - Teacher – How was the anemone using a rock.
      - Student – It was sticking to the rock.
      - Teacher – Why do you think anemone's stick to rocks?
      - Student – So they don't get washed away by the ocean.
      - Teacher – Why would the anemone want to stay here and not float around in the ocean.
      - Student – Because it's protected here and it's calm and safe compared to the ocean where the anemone could be eaten by a fish or a shark.

Humans & the Rocky Seashore

Assistant Team Lead Teaching Notes:

- Help walk students safely to the storm drain area.
- Interact with students when they are looking at the storm drain. Potential questions include:
  - What do you think this is?
  - Where do you think the other end of this pipe starts?
  - What do you think moves through this pipe?
  - Why do you think humans built this pipe?
- Help students make observations about how humans are interacting with the rocky seashore. Potential questions include:

Location: Walk to/from a Storm Drain/Storm Drain

Timing for this station:

- Intro (5 min)
- Walk to storm drain (10 min)
- Storm Drain (5 min)
- Debrief (15 min)
- Walk back to grassy area (5 min)

Intro:

- At this station you will investigate - **How humans interact with water, rocks, and other animals at the rocky seashore?**
    - *o* Your job is to observe humans, make observations, and ask questions.
    - *o* You will make observations as we walk.
    - *o* You can use any tools in your backpack as we go.
- Expectations for exploration.
    - *o* Be your best self!
        - **Be curious!**
            - We will stop as we walk, from time to time, to make observations but you should make observations the whole time.
        - **Be respectful!**
            - Stay with the group.
            - We must keep the group together so if you are walking slower than the other science leaders, you will be making them wait.
            - Share your findings with other science leaders around you.
            - Listen to any adults that give you directions.
        - **Be safe!**
            - Keep up with the group and stay between adults.
                - *o* Define who will lead the group (Team Lead) and who will be at the back of the group (Assistant Team Lead).

Walk to Storm Drain:

- Walk students to storm drain.
- Stop 2-3 times on the walk to give students time to look for ways humans are interacting with the rocky seashore.
    - o Remind students to use binoculars.
    - o Potential Questions:
        - What do you notice people doing at the rocky seashore?
        - How are humans interacting with the water? Rocks? Animals?

Storm Drain:

Instructor note: Try to point out any trash – even tiny pieces in the sand at the storm drain outlet. The goal is for students to realize that storm drains connect neighborhoods to the rocky seashore/ocean.

- Stop at pre-determined storm drain location.
- Allow students to gather around and look around the storm drain opening.
- Potential questions to ask as students are looking in/around storm drain:
    - What do you think this is?
    - Where do you think the other end of this pipe starts?
    - What do you think moves through this pipe?
    - Why do you think humans built this pipe?
    - Could anything else besides water flow through this drain?
    - Would that be good or bad for the animals that live around the rocky seashore?
- Be sure to cover:
    - This is a storm drain.
    - It connects the neighborhood streets above to the ocean.
    - When it rains in the neighborhood above, water goes into the drains and eventually comes out here at the ocean.
    - Other things like trash, oil, liquids spilled on the street, etc. might also come through the storm drain and end up here on the beach.
    - Trash and pollution that end up on the beach could be harmful to the animals that live at the beach and rocky seashore.

Process Reflection:

- (Gather all students together in a tight group where they can sit and work in their science notebooks.)

- Humans & the Rocky Seashore Intro:
    - It is now time to write down the observations we made along our walk and at the storm drain about how humans interact with water, rocks, and other animals at the rocky seashore.
    - You will have approximately five minutes to:
        - (Show students the page they will be working on in their science notebook w/ an already done example.)
        - Draw a stick figure at the rocky seashore in the center of your page.
        - Write or draw two ways you observed humans interacting with the water, the rocks or other animals.
            - You can include any observations you made today, while at the tidepools, on the walk to the storm drain, or the storm drain itself.

    - Have students open their science notebooks to “Humans at the Rocky Seashore” page.
        - Review boundaries for sitting.
        - Remind students to Be Their Best Self.
            - Be respectful. If another science leader has chosen an area to sit, go and find another place to sit and work.
            - Be safe: Stay within the boundaries.

- Humans & the Rocky Seashore:
    - Give students time to spread out.
    - (Give students five minutes to work.)

- (Give students a two and one-minute warning.)
- (Gather students together to do Humans & the Rocky Seashore Debrief.)

- Humans & the Rocky Seashore Debrief:
  - *Instructor note: Focus this conversation on the NGGS Cross Cutting Concept: Systems and System Models. Humans at the rocky seashore interact with the physical environment (i.e. rocks, waves, etc. and other animals).*

  - Ask students to share what they drew/wrote about how humans interact with the water, rocks, or other animals?
    - Ask students follow up questions to their response in order to get to the idea of how/why animals interact with the physical and biological environments.
      - Teacher – What is one way you observed humans interacting with the physical environment?
      - Student – The storm drain.
      - Teacher – Can you tell me how the storm drain is connected to people?
      - Student – People built the storm drain.
      - Teacher – Okay. Can you tell me how the storm drain interacts with the rocky seashore.
      - Student – Stuff comes out of the storm drain and lands here.
      - Teacher – So in your own words tell me how humans are interacting with water, rocks, or other animals?
      - Student – Stuff from people – like water and trash we saw comes out of the storm drain and lands here on the rocks – it makes it kind of messy.
      - Teacher – What does that make you think about?
      - Student – I don't like it. I feel like the trash makes it look messy but also might be bad for the animals.

Walk back to Grassy Area.

- Walk students back to grassy area for self-reflection and good-bye.

Lunch

- Give students an opportunity either before or after lunch to use the restrooms.
- Eat lunch with students in the grassy area.
- Be sure students throw away all trash.
- Remind students that Ocean Discovery leaves a place better than we found it- encourage them to pick up any additional trash they see.
- Give students hand sanitizer when finished with lunch.

Self-Reflection

Assistant Team Lead Teaching Notes:

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

Circle Toss Intro:

- Ask students to write down three words about how they feel about doing science today.
    - Give students some examples: proud, fun, tiring, 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.)

Clean up + Walk to Buses + Goodbye
(*If using the "A Little Late" or "A Lot Late" schedule skip the "Clean out Explorer Packs" but collect science notebooks and do "Go Awesome!" cheer.)*

Collect Science Notebooks & Water bottles:

- 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 Ziploc bag with school and teacher's name on it.
- Collect borrowed water bottles.

Clean out explorer packs:

- Have students empty out their backpacks onto the grass.
- Have students make sure they have each of the following:
    - Binoculars
    - Hand lens
    - Rocky Seashore Animal ID Card
    - Pencil
- 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.

Believe! Achieve! Lead! Go Awesome!

- 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 more about the rocky seashore.
- Thank you for being your best self today science leaders!
    - At Ocean Discovery Institute we **BELIEVE** that science is something you can do and a science leader 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 with a stop at the restrooms if time allows.)

Clean Up & Return to Lab:

- Place all crumpled papers into recycling bag.
- Clean all white boards with dry erase cleaner.
- Restock Team Lead backpacks:
  - Bandanas
  - Pens
  - Dry erase markers
  - Extra science notebooks
  - Extra pencils
- Organize explorer packs (if there wasn't time for students to do this).
- Return to Living Lab and:
  - Run water bottles through dishwasher at Living Lab
  - Place science notebooks into file box in Living Lab.
  - Throw away any trash or recycling.

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 clean up trash from the canyon to protect the rocky seashore.
- (Tomorrow) I am an ecologist who explores the rocky seashore.
- (Imagination Station) I am an ecologist who explores the rocky seashore.

Supplies:

Arrival

- Ocean Discovery Institute Field Trip Volunteer Card (1/chaperone)
- Cover sheets & rosters (1/class)
- Stop signs (2)
- Community Agreements Poster (1)

Introduction

- 3rd Grade Make a Difference Day PowerPoint
  - Papi://Curriculum/SI New/Upper Elementary (3-5)/3rd Grade/Make A Difference Day Visuals
- Science Discovery Process Poster (3)
- Science Notebooks (1/student)
  - Return the same notebooks to students they used on Explore Day
  - Have ~5 extra science notebooks for students who were absent from Explore Day
- Pencils (1/student)
- Water coolers (filled w/ water) (2)
- Water cups (1/student)

Make a Difference Today

- Portable 1st Aid Kits (1/team lead)
- Work gloves (40)
- Blue buckets for picking up trash (20)
- Large trash bag (1/class)

Imagination Station

- Large EZ Up Canopy (1)
  - Cover the entrance with wave backdrops and cardboard animals, we want students to feel like they are entering/leaving a special place.
- Folding tables (3)
  - Two for Meet and Greet animals
  - One inside tent with hand lenses
- Portable speaker + ipod (1)

    - iPod loaded with rocky seashore sounds
- Small clipboards (35)
    - Large enough to fit science notebooks on.
- Live invertebrates
    - Laminated "Live Animal Handling Protocol" (2)
        - Papi://Curriculum/All Program folder.
    - Four different invertebrates (1/each)
        - Ex: Brittle stars, urchins, hermit crabs, snails, giant key hole limpet, etc.
- Organism Name & Adaptation Card laminated (1 for each type of live invertebrate)
- Towels (8)
- Small aquaria w/ lids (4)
- Bubblers (4)
- Extra batteries for bubblers
- Folding table
- Hand lenses (35)
- Plastic art bin (1)
    - To store hand lenses.
- Petri dishes (10)

Make a Difference Tomorrow
- Dry towels (4)
- Large plastic bin (2)
- Bucket of clay (2)
- Laminated "Survivor" sign (2)
- Laminated "Non-survivor" sign (2)
- Acrylic panel made to look like a rocky seashore (2)
- Home Depot bucket (2)
- Large beakers (6)

Lunch
- Hand sanitizer (2)
- Blankets (10+)
- Water coolers (3)

Self-Reflection
- Post-Its
    - Yellow (100)
    - Blue (100)
- Large sticky chart paper (8 sheets)

Surveys
- Laptops w/teacher survey (3)
- Believe surveys (1/student)

3rd Grade MAD Timing

On Time:

Time	Group 1	Group 2	Group 3
9:30 – 9:40	**Arrival** Watershed Plaza		
9:40 – 10:00	**Introduction** Ecolab	**Introduction** SciTech Lab	**Introduction** Ocean Alcove
10:00 – 10:35	**MAD Tomorrow** Ecolab	**MAD Today** SciTech Lab	**Imagination Station** Ocean Alcove/Plaza Del Sol
10:35 – 10:55	**Science Leader Student Connection** Ecolab	**Science Leader Student Connection** SciTech Lab	**Science Leader Student Connection** Ocean Alcove
10:55 – 11:15	**Lunch + Bathroom Break** The Commons, Rock Amphitheater, & Fisler Family Tree		
11:15 – 11:50	**Imagination Station** Ocean Alcove/Plaza Del Sol	**MAD Tomorrow** Ecolab	**MAD Today** SciTech Lab
11:50 – 11:55	**Switch Activity Locations**		
11:55 – 12:30	**MAD Today** SciTech Lab	**Imagination Station** Ocean Alcove/Plaza Del Sol	**MAD Tomorrow** Ecolab
12:30 – 12:45	**Self-Reflection** SciTech Lab	**Self-Reflection** Ocean Alcove	**Self-Reflection** Ecolab
12:45 – 12:55	**Surveys** SciTech Lab	**Surveys** Ocean Alcove	**Surveys** Ecolab
12:55 – 1:00	**Clean Up + Goodbye**		

Late Start School/A Little Late:*
* less time at these stations

Time	Group 1	Group 2	Group 3
9:45 – 9:50*	**Arrival** Watershed Plaza		
9:50 – 10:00*	**Introduction** Ecolab	**Introduction** SciTech Lab	**Introduction** Ocean Alcove
10:00 – 10:35	**MAD Tomorrow** Ecolab	**MAD Today** SciTech Lab	**Imagination Station** Ocean Alcove/Plaza Del Sol
10:35 – 10:55	**Science Leader Student Connection** Ecolab	**Science Leader Student Connection** SciTech Lab	**Science Leader Student Connection** Ocean Alcove
10:55 – 11:15	**Lunch + Bathroom Break** The Commons, Rock Amphitheater, & Fisler Family Tree		
11:15 – 11:50	**Imagination Station** Ocean Alcove/Plaza Del Sol	**MAD Tomorrow** Ecolab	**MAD Today** SciTech Lab
11:50 – 11:55	**Switch Activity Locations**		
11:55 – 12:30	**MAD Today** SciTech Lab	**Imagination Station** Ocean Alcove/Plaza Del Sol	**MAD Tomorrow** Ecolab
12:30 – 12:45	**Self-Reflection** SciTech Lab	**Self-Reflection** Ocean Alcove	**Self-Reflection** Ecolab
12:45 – 12:55	**Surveys** SciTech Lab	**Surveys** Ocean Alcove	**Surveys** Ecolab
12:55 – 1:00	**Clean Up + Goodbye**		

Very Late:*
*Less time at these stations

Time	Group 1	Group 2	Group 3
10:00	(Students go immediately to their Intro areas)		
10:00 – 10:10*	**Introduction** Ecolab	**Introduction** SciTech Lab	**Introduction** Ocean Alcove
10:10 – 10:35*	**MAD Tomorrow** Ecolab	**MAD Today** SciTech Lab	**Imagination Station** Ocean Alcove/Plaza Del Sol
10:35 – 10:55	**Science Leader Student Connection** Ecolab	**Science Leader Student Connection** SciTech Lab	**Science Leader Student Connection** Ocean Alcove
10:55 – 11:15	**Lunch + Bathroom Break** The Commons, Rock Amphitheater, & Fisler Family Tree		
11:15 – 11:50	**Imagination Station** Ocean Alcove/Plaza Del Sol	**MAD Tomorrow** Ecolab	**MAD Today** SciTech Lab
11:50 – 11:55	**Switch Activity Locations**		
11:55 – 12:30	**MAD Today** SciTech Lab	**Imagination Station** Ocean Alcove/Plaza Del Sol	**MAD Tomorrow** Ecolab
12:30 – 12:45	**Self-Reflection** SciTech Lab	**Self-Reflection** Ocean Alcove	**Self-Reflection** Ecolab
12:45 – 12:55	**Surveys** SciTech Lab	**Surveys** Ocean Alcove	**Surveys** Ecolab
12:55 – 1:00	**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, Ocean Alcove)

- € Open all windows and shades.
- € Pull out hand sanitizer and pencils from cabinet.
- € Set up seven tables with four chairs each (additional chairs off to the side).
- € Turn on Smartboard.
  - O Load "3rd Grade Make a Difference Day PowerPoint"
  - O Log into Zoom.
    - Test camera angle.
  - O Open PowerPoint.
    - Test sound on videos.
- € Put ~30 clean cups in the "clean" bin on top of water cooler. Place "dirty" bin next to it.
- € Ensure water cooler is filled with water.
- € Set out a Science Discovery Process Poster.
- € Prep Word Wall – be sure it is clear and ready to use.
- € Spread science notebooks out on a table (one class at each location).
- € Make sure you have enough printed Believe surveys.
- € Set up two laptops with teacher surveys.

Science Leader-Student Connection (Eco Lab, SciTech Lab, Plaza Del Sol)

- € Check the whiteboard in the IS Program Manager's office to see who will be the science leader on the call for the day.
- € Setup whiteboard & stand for brainstorming questions for Science Leaders.

Make a Difference Tomorrow (Ecolab)

- € Set up two "rocky seashores" on the porch of the Ecolab. For each one:
  - O Place a plexiglass panel at an angle inside the large plastic tub (to create a "rocky seashore").
  - O Fill Home Depot bucket with water about 2/3 full.
  - O Set buckets of clay off to the side.
  - O Place dry towels off to the side.

Program Set Up Continued:

Make a Difference Today (SciTech Lab)

- € Have a bin with work gloves and a stack of blue buckets on the porch.

Imagination Station (Plaza Del Sol)

- € *REFER TO: Live Animal Handling Protocol throughout set-up for this station.*
- € Set up two folding tables near circle tank for Meet and Greet activity.
- € Choose four living invertebrates to be used (there needs to be four of each kind chosen)
  - O Transfer invertebrates to be used are in small aquaria.
  - O Place bubblers in each aquaria.
  - O Be sure aquaria are well shaded.
- € Place towels, petri dishes, and Organism Name & Adaptation Cards off to the side.
- € Set up one large canopy decorated with blue and green streamers hanging down that keep students from seeing rocky seashore animals before they enter.
  - O See "Imagination Station Canopy Set-up Photo" below.
  - O Place one folding table inside the tent w/ hand lenses in a plastic art bin on top.
- € Turn on portable speaker + iPod with rocky seashore sounds.

Lunch (The Commons, Rock Amphitheater, & Fisler Family Tree)

- € Retrieve blanket bin from downstairs storage (use hand cart to transport)
- € Spread out 6 blankets on the ground (concrete) in the Commons
- € Place 2 blankets on the ground (dirt) near the Fisler Family Adventure Tree
  - O Do not put blankets on the boulders

Self-Reflection (SciTech, Eco Lab, Plaza Del Sol)

- € Post-it notes (Yellow and Blue)
- € Write one reflection question on two pieces of chart paper. Two reflection questions = 4 total pieces of chart paper per location.
  - O I think science is important because…. x 2
  - O Science Leaders make a difference in the world by… x 2
- € The reason there are two of each poster is so that assistant team leads can put half the student responses on one poster and the other half on the other poster which will allow students to spread out and see posters more easily.

Imagination Station Canopy Set-up Photo



Arrival

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.

- 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.

  - Team Lead (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 team leads 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.

  - Team Lead (1)
    - Review Community Agreements:

- Working as a team of science leaders 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 poster.)
- **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.

o Assistant Team Leads (2)

▪ 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 team leads will walk them to their Introduction area.
    - Students high five ODI statue on the way past.
-

Transition Activities (2-3 minutes/activity)

Activities that can be used throughout the day when transitioning students from task to another, or you need to get students focused on the instruction, or to get out wiggles.

- High/low tide dance
- 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.
- Play a quick game of crabby says. (There is no need for anyone to get "out" the goal is just to get everyone quiet and settled. Example:
  - Crabby says show me your eyes on stalks (make a hand motion)
  - Put up your claws.
  - Move from side to side like a crab.
  - Show me your claws grabbing at food.
  - Show me your eye stalks.
  - Crabby says place your hands over your mouth so you can hide from predators.
  - Crabby says sit down as quietly as you can so you can hide in seagrass from predators.
  - ~~Immediately transition into intro.~~

Introduction

Assistant Team Lead Teaching Notes:

- € Help students find their science notebook and take a seat.
- € Help to hand out water bottles.
- € Sit with students during introduction and model good listening skills.
- € Whenever appropriate add words and definitions to the "Word Wall".

Timing for this station Eco Lab:

- **Bathroom Break** (5 min)
- Science Notebook/Water (3 min)
- Staff/Volunteer/Living Lab Intro (3 min)
- OL Video + Debrief (5 min)
- Review Rocky Seashore/Make a Difference (5 min)

Timing for this station SciTech Lab:

- Science Notebook/Water (3 min)
- Staff/Volunteer/Living Lab Intro (3 min)
- OL Video + Debrief (5 min)
- Review Rocky Seashore/Make a Difference (5 min)
- **Bathroom Break** (5 min)

Timing for this station Plaza Del Sol:

- Science Notebook/Water (3 min)
- Staff/Volunteer/Living Lab Intro (3 min)
- **Bathroom Break** (5 min)
- OL Video + Debrief (5 min)
- Review Rocky Seashore/Make a Difference (5 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.

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:

- Introduce Ocean Leader Video:
  - Introduce you to someone who grew up in City Heights and participated in Ocean Discovery programs just like you who is a science leader.
  - Meet (Ocean Leader) who is a (career).
  - (Play Ocean Leader video on PowerPoint.)

Debrief Ocean Leader Video:

- Potential whole group questions include:
  - 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:
  - 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 science leader. The question is, could you if you wanted to?
  - Have 2-4 students share their thoughts. Follow-up questions could include:
    - What kind of science leader would you like to be?
    - What would you like to study as a science leader?
    - Do you think it is difficult to become a science leader? What would make it difficult? What could you do to overcome those challenges?

Review Science Notebooks:

- Remember you have one of the most essential tools of a science leader in your hand- a science notebook.
- You used it to write down and draw your thoughts, questions and observations at the rocky seashore and you will do the same today.
- 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 Rocky Seashore:

- (Show Rocky Seashore slide.)
- Define rocky seashore = a rocky place where the land and ocean meet.
  - (Add "Rocky Seashore" and definition to the Word Wall.)
  - Ask students to name some of the animals that live at the rocky seashore.
    - You can remind them of their classroom rocky seashore if they struggle.
- Remind students that the tide changes daily at the rocky seashore and that there is a high tide and a low tide.
  - (Show High Tide Low Tide slide.)
  - Have students do kinesthetic movements for high tide and low tide.
  - (*See Community Building Day – Rocky Seashore Intro for movements*.)

- Review tidepools.
    - Define tidepool: a body of saltwater that is left behind when the tide goes out.
        - (Add "Tidepool" and definition to the Word Wall.)
    - Ask students when you get more tidepools during high or low tide? – Low tide.
- Review Explore Day
    - What are some things we saw during our Exploration Day?

Make a Difference:

- Introduce the concept of Making a Difference and protecting the rocky seashore.
    - Potential questions include:
        - Do you think the rocky seashore is an area worth protecting? Why or why not?
        - How many different living things rely on the rocky seashore for survival?
            - Ask students what types of animals they saw at the rocky seashore and how they interacted with the water, rocks, and other animals.
- Making a Difference
    - Over the last few weeks, you have learned a lot about the rocky seashore and the animals that live there.
    - Remember the Science Discovery Process starts and ends with making a difference! As science leaders, it is critical that each of us think about how we can Make a Difference in the world.
    - Today we will explore how to Make a Difference and help protect the rocky seashore and the animals that live there today and in the future!
- Let's go Make a Difference Science Leaders!
    - *o*

Make a Difference Today

Objective: Students learn that their neighborhood is connected to the ocean through the watershed and trash from their neighborhood can make its way to the ocean and hurt the animals that live at the rocky seashore. Students make a difference today by picking up trash in the canyon to protect the animals that live in/around the rocky seashore.

Assistant Team Lead Teaching Notes:

- Spread out, sit and model good listening behavior during intro and process reflection.
- Monitor students as they collect trash.
  - Help students say within the boundaries.
- As students are working ask questions. Potential questions include:
  - How do you think trash and pollution could impact the animals you saw at the rocky seashore?
  - How does it feel to be making a difference in the world?
  - Can you think of any other way we could help prevent trash from getting to the rocky seashore?
- Whenever appropriate add words and definitions to the "Word Wall".

Timing for this station:

- Watershed Introduction (7 min)
- Walk to/from Canyon (8 min)
- Pick up Trash in Canyon (15 min)
- Process Reflection (5 min)

Watershed Introduction:

- Build on concept of Making a Difference and protecting the rocky seashore.
  - As science leaders who know how important the rocky seashore is, it is important that we help protect it.
  - At this station we will learn how our neighborhood in City Heights is connected to the rocky seashore and how we can make a difference and help protect the rocky seashore today!
- Review storm drain outlet experience from Explore Day.
  - Ask students what they remember about the storm drain they saw during Explore Day.
    - (Show La Jolla Storm Drain slide.)
- Storm drains.
  - Define storm drain:
    - Storm drain: drain built to carry away extra water during heavy rains.
    - (Add "Storm drain" and definition to the Word Wall.)
  - Storm drains connect neighborhood streets to the ocean.
    - (Show Trash to the Ocean Video in PowerPoint.)

- When it rains in La Jolla, water flows off the streets, into the storm drains, and eventually that water comes out of the storm drain and flows onto the beach and into the ocean just like in the video.
- That means anything that is on the streets can also be picked up by the rain and carried through the storm drains to the beach and ocean.
  - (Show Trashy Storm Drain slide.)

- City Heights & Storm Drains
  - Do you think City Heights is connected to the rocky seashore like La Jolla?
    - Have you ever seen one of these in your neighborhood?
      - (Show City Heights Storm Drain slide.)
      - This is a storm drain. It's meant to carry rainwater off our streets but also picks up our trash. When it rains in City Heights, the water from the streets and trash enters the storm drains and is carried through a series of underground pipes to the beach and ocean.
      - It's one way trash from our streets in City Heights gets to the beaches and ocean.
      - All neighborhoods are connected the ocean!
- Make a Difference.
  - As science leaders it is important that we Make a Difference in our world!
  - Today we will make a difference by picking up trash in the canyon that would eventually make its way to the rocky seashore through storm drains.
- Expectations for Trash Clean Up.
  - (Show Expectations slide.)
  - Everyone will wear gloves.
    - (Show gloves.)
  - Place any trash you find in a blue bucket.
    - (Show bucket.)
  - Stay between the Team Lead and Assistant Team Lead while working.
  - No pieces of trash that are larger than your bucket can be picked up.
    - Let an adult know about larger trash so we can return and remove it later.

<u>Walk to Canyon</u>:

- Students should walk between Team Lead and Assistant Team Lead.

<u>Pick up Trash in the Canyon:</u>

- Establish boundaries for picking up trash.
- Remind students we are not looking for large trash.

<u>Walk back to Living Lab:</u>

- Perform a head count before departing the canyon and upon return to the Sci Tech Lab.

- Students should walk between Team Lead and Assistant Team Lead.

Process Reflection

- Collect Trash back at your starting location.
    - Have students dump all the trash from the blue buckets into a trash bag.
    - (Show students how much trash they have collected.)
- Think-Pair-Share
    - (Show Making a Difference Today slide.)
    - Students will respond to the sentence stem: I made a difference by helping to pick up trash. Cleaning the canyon made me feel…"
        - Think: Have students write their response to the question in their science notebook on the "Make A Difference Today" page.
        - Pair: Have students pair up and share their responses with each other.
        - Share: Call on a few students to share their responses.
- Great job science leaders!
    - You helped make a difference today by picking up all this trash that would have eventually made their way to the ocean and possibly been eaten by animals that live at the rocky seashore.
    - Remind students that sharing what they know with friends and family is important. They can now explain to people why it's important to dispose of trash appropriately!

Make a Difference Tomorrow

Objective: Students become ecologists and make observations about how waves impact animals at the rocky seashore. Students learn that they can make a difference in the future by becoming ecologists and learning more about how plants and animals interact with their environment at the rocky seashore.

Assistant Team Lead Teaching Notes:

- Model good listening behavior during introduction and process reflection.
- Whenever appropriate add words and definitions to the "Word Wall".
- Help students build clay invertebrates and attach them to the correct rocky seashore.
  - Be sure that there are a few animals that will survive the wave (even if you have to add them).
    - Ex. chiton, giant limpet, snail,
  - Be sure there are at a few animals that won't survive the wave (even if you have to add them).
    - Ex. dog, giraffe, human, etc.
- Throw a "wave" of water over one "rocky seashore".
  - BE CAREFUL not to create too strong of a wave that knocks everything off!
- Lead "Activity Debrief" with half the class (see curriculum below).
- During the Process Reflection:
  - Refill Home Depot buckets with water for next group.
  - Clean off plexiglass "rocky seashore" as much as possible for next group.
  - Reset up "rocky seashore" for next group.
  - Put wet clay into one clay bucket and cover.

<u>Timing for this station:</u>

- Introduction (10 min)
- Life on the Rocks (20 min)
- Process Reflection (5 min)

<u>Introduction</u>:

- Build on concept of Making a Difference and protecting the rocky seashore.
  - As science leaders who know how important the rocky seashore is, it is important that we help protect it.
  - One of the ways that you can make a difference in the future is by becoming a science leader who studies the rocky seashore and the animals that live there.

- Introduce Ecologist Career
  - One type of science leader who studies the rocky seashore is an Ecologist.
    - (Show Ecologist slide on PowerPoint.)
    - Define Ecologist = a science leader who studies how plants and animals interact with their environment.

- (Add "Ecologist" and definition to the Word Wall.)

- Ecologists can Make a Difference by studying the rocky seashore to:
  - (Show Make a Difference slide.)
  - Build knowledge about our world.
  - Develop innovative technology.
  - Solve problems that face our planet
  - Improve human lives.
- For example: Ecologists are studying the way mussels filter seawater to design new water purification systems that could help remove pollution from water.
  - (Show Mussel slide.)
  - Ask students: How could studying mussels filtering seawater help solve problems facing our planet?
- Today all of us will be Ecologists studying the rocky seashore.

- Rocky Seashore Physical Environment.
  - As Ecologists we are going to "Explore and Wonder" about the question: How are animals adapted to life at the rocky seashore?
    - (Show Explore and Wonder slide.)
  - We will start by watching a short video about the Rocky Seashore.
    - While you are watching, focus on making observations about what could make life challenging for animals living at the rocky seashore.
    - (Play Rocky Seashore Video in PowerPoint.)
    - (Show Rocky Seashore slide.)
    - Ask students to share observations.
  - The rocky seashore is a harsh environment. Animals who live there must deal with many things such as:
    - Waves – get knocked off rocks, carried out to the open water, etc.
    - Rocks moving around – get injured, lose a hiding place, etc.
    - Water and lack of water – dry out, drown, etc.
    - Sunlight – dry out, etc.
    - Predators – escaping from animals that want to eat you
    - Prey – finding food to eat, etc.
  - Animals that live at the rocky seashore must be adapted to live there.
- Introduce adaptation.
  - Define Adaptation: something that helps an animal to survive.
    - (Add "Adaptation" and definition to the Word Wall.)
    - (Show Adaptations slide.)
    - Have students come up with examples of adaptations for a polar bear.

- Fur – warmth
- White fur – camouflage to catch prey
- Claws – to catch prey, etc.

o The animals that live at the rocky seashore also must have adaptations to help them survive life at the rocky seashore – which we know is pretty tough.

<u>Life on the Rocks</u>

- Introduce activity (3 min):
  - o We are going to Investigate our question: How are animals adapted to life at the rocky seashore?
    - (Show "Investigate" slide.)
    - We will start by making a hypothesis.
  - o Define hypothesis:
    - Hypothesis: an educated guess.
      - (Add "Hypothesis" and definition to the Word Wall.)
    - All of you have knowledge of what life is like at the rocky seashore since you have been studying the rocky seashore with Ocean Discovery and you explored the rocky seashore last week.
    - Using your knowledge of the rocky seashore, you will each get to design an animal out of clay you think could survive there.
  - o Describe Investigation.
    - Everyone will have five minutes to build an animal our of clay that they think could survive at the rocky seashore.
    - Everyone will then place their clay animal on one of our "rocky seashores".
      - (Show both plexiglass "rocky seashores" angled in the plastic tub.)
    - Myself and xx will then create a "wave" using these buckets of water.
      - (Hold up an orange Home Depot bucket.)
    - We will then analyze our data by comparing the animals that survived (stayed attached) to the animals that did not survive (got knocked off by the "wave").

- Build an Invertebrate (5 min):
  - o Divide the room in half and point our which "rocky seashore" they will be using.
  - o Give each student a piece of clay.
  - o Set digital timer for five minutes.
  - o Give students a two-minute and one-minute warning.
  - o As students finish have them come up and add their clay invertebrate to the plexiglass.

- Activity (5 min):

- Once all invertebrates are attached to the "rocky seashore" have students step backwards out of the "splash zone.
- Take the bucket and create a "wave" by dumping the water over the entire panel.
  - BE CAREFUL not to create too strong of a wave that knocks everything off!
- Take the clay invertebrates that fell off and place next to the "non-survivor" laminated card.
- Take the clay invertebrates that stayed attached and place next to the "survivor" laminated card.

- Debrief Activity (7 min):
  - We will now analyze our data to determine what kinds of adaptations can help animals survive at the rocky seashore:
    - Ask students to look at "survivors" to find similarities that helped them stay attached to rocky seashore after the wave. Potential questions include:
      - What similarities do you notice about the survivors?
      - What do you think helped these animals stay stuck to the rocks?
    - Be sure to cover the below rocky seashore adaptations and their kinesthetic movements:
      - **Flat body**
        - Less impact from waves = less chance to get knocked off
        - Kinesthetic movement: stand up straight w/ legs together and arms straight at your side. Say "Flat body!"
      - **Round body shape** – versus a blocky or more square shape.
        - Allows water to flow around you more easily.
        - Kinesthetic movement: Use your hands to make a giant circle in front of your face Say "Round shape!"
      - **Large sticking area**
        - Larger surface area to stay stuck to rocks.
          - Muscular Foot (snails, chitons, etc.):
            - Kinesthetic movement: Curl arm to show muscle and point to foot. Say "Muscular foot!"
          - Tube feet (sea stars)
            - Kinesthetic movement: Fingers wiggling. Say "Tube feet!"
    - If time allows: have students practice the kinesthetic movements a few times.
      - Loud voice, whisper voice, slow motion, etc.
  - Have students open their science notebooks to "Make a Difference Tomorrow" page.
    - Have students draw the animal they made out of clay and answer the question, Did your animal survive the rocky seashore? Why or why not?

Process Reflection:

- Make a Difference Tomorrow and help protect the rocky seashore.
    - Think-Pair-Share
        - (Show Think-Pair-Share slide.)
        - If you were an Ecologist, what would you do to help protect the rocky seashore?

- Review becoming a science leader to Make a Difference Tomorrow.
    - (Show Make a Difference Tomorrow slide.)
    - Great job with all your observations today, Ecologists!
    - Some of you might make a difference in the future by becoming an Ecologist or other type of science leader when you grow up.
    - You might discover new ways to improve human lives, solve problems facing our planet, or build knowledge about our world by studying the rocky seashore in the future!
    - In the mean time you can tell family and friends what an amazing place the rocky seashore is and why it's important to protect it.
    - When people understand the importance of a place like the rocky seashore, then they are more likely to take care of that place and that's a great way to make a difference today and in the future!

Imagination Station

Objective: Students imagine they are ecologists, observe living rocky seashore animals, and make observations about how these animals are adapted to the harsh conditions at the rocky seashore.

Assistant Team Lead Teaching Notes:

- € Model good listening behavior during introduction and process reflection.
- € Whenever appropriate add words and definitions to the "Word Wall".
- € Imagination tent:
  - o Ramp up the excitement – "Alright Ecologists! We are about to visit the tidepools! Are you ready?!"
  - o Help distribute and collect hand lenses.
- € Help bring out and return living animals during the Meet and Greet activity.
- € During Meet and Greet Activity:
  - o Ask students – what kind of adaptations do you think this animal has?
  - o Utilize Organism Name & Adaptation Cards, hand lenses, and petri dishes to help students study organisms.

Timing for this station:

- Introduction (5 min)
- Walk to Plaza Del Sol & Enter Rocky Seashore Imagination Tent (5 min)
- Meet and Greet (20 min)
- Process Reflection (5 min)

Introduction:

- Today you are going to imagine that you are an ecologist who explores the rocky seashore and animals that live there.
  - o **(Note: if you have already visited the Make a Difference Tomorrow station you can review this briefly).**
  - o Explain what an ecologist studies.
    - (Show Ecologist slide on PowerPoint.)
    - Define Ecologist = a science leader who studies how plants and animals interact with their environment.
      - (Add "Ecologist" and definition to the Word Wall.)
  - o When working in the field, it is important for an ecologist to be prepared so they can study the animals.
  - o Introduce the harsh physical environment of the rocky seashore.
    - We are going to watch a short video about the Rocky Seashore. While you are watching I want you to focus on making observations about things that make life difficult at the rocky seashore for animals.
    - (Play Rocky Seashore Video in PowerPoint.)

        - (Show Rocky Seashore slide.)
            - What observations did you make about what makes life difficult at the rocky seashore?
        - The rocky seashore is a harsh environment. Animals who live there must deal with:
            - Waves – get knocked off rocks, carried out to the open water, etc.
            - Rocks moving around – get injured, lose a hiding place, etc.
            - Water and lack of water – dry out, drown, etc.
            - Sunlight – dry out, etc.
            - Predators – escaping from animals that want to eat you
            - Prey – finding food to eat, etc.
        - Animals that live at the rocky seashore must be adapted to survive at the rocky seashore.
    - Introduce adaptation.
        - Define Adaptation: something that helps an animal to survive.
            - (Show Adaptations slide.)
            - Have students come up with examples of adaptations for a polar bear.

- Imagination Station Tents:
    - In a moment we will walk upstairs an "visit" the rocky seashore.
    - Once you enter the rocky seashore your job as an ecologist will be to collect data about how the animals you see are adapted to life at the rocky seashore.
        - Using your science notebook, you will sketch each animal you observe and write down at least one adaptation that animals has.
            - (Show Science Notebook Example slide.)
            - In each box you will draw one animal and write an adaptation the animal has.
            - (Have students open to "Imagination Station" page in their science notebooks.)
        - When studying the animals at the rocky seashore it can be helpful to have tools – today each of us will have a hand lens just like when were at the real rocky seashore.
            - Review how to use a hand lens.
            - Remind students that they are only to be used for viewing animals not for touching the animals.
            - (Hand each student a hand lens.)
        - Give each student a clipboard and have them attach their notebook to the clipboard open to the page they need to write on.
- Introduce expectations for Meet and Greet.

- We will be observing several living animals.
  - (Show Expectations slide.)
    - Make room for everyone to see the animals.
    - Take turns touching.
    - Be very gentle when touching animals – use a two-finger touch.
  - Be curious: Think about and share with the group ways you think these animals are adapted to the rocky seashore.
- We will rotate around to different tables so you will get to see all the invertebrates.
  - Divide students into four groups.

<u>Walk to Plaza Del Sol & Enter Rocky Seashore Imagination Tent</u>

- Create excitement with the students as they approach the tent.
  - Okay Ecologists!
  - We are about to be transported to the rocky seashore!
  - Is everyone ready?!
  - Does everyone remember their job when we get to the rocky seashore?
  - Okay Ecologists! Let's go explore!
- (Walk students through streamers.)

<u>Meet and Greet</u>

- Meet and Greet:
  - Place one type of invertebrate on each table.
    - Assign each group to a table so that each group is looking at one invertebrate.
      - (When viewing hermit crabs place a hermit crab in a petri dish so students can get a better look.)
    - Next to each animal place an "Organism Name & Adaptation Card" face up with the animal's name only.
  - Ask students – what kind of adaptations do you think this animal has?
    - **Be sure to ask follow-up questions to establish what the adaptation helps the animals survive (i.e. – protection from waves, predators, sunlight, etc.)**
    - Example:
      - Student: The urchin has spines.
      - Teacher: Thank you for that observation. How do you think spines help the urchin survive at the rocky seashore?
      - Student: Spines can protect the urchin from a predator.
      - Teacher: Okay how to spines help protect the urchin from a predator?
      - Student: Predators don't want to eat is because the spines would hurt their mouth.

- Once you have established 1-2 adaptations for an animal and all student have gotten a chance to touch the animal have all students draw the animal in their science notebook and write down an adaptation.
    - Flip over "Organism Name & Adaptation Card" to show the side with the adaptations.
    - Explain to students they only need to draw and label one adaptation but can do more if they want to.
- When time is up, rotate each group to a new table.
    - (Spend approximately 3-4 minutes per animal.)

- When time is up:
    - Return all animals to cart.
    - Be sure bubblers are turned on and animals are in the shade.
    - "Transport" students back to the Living Lab through the streamers.
    - Collect hand lenses.

Debrief:

- Have students stand in a circle in the Plaza Del Sol.
- Think-Pair-Share.
    - How did it feel to be an Ecologist today?
    - Do you think you could be an Ecologist when you grown up? Why or why not?

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 rocky seashore.
    - 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 needs to be wrapped up, you can move to the microphone to signal that you want to speak.
            - After the Science Leader answers a question, in a sentence or two, reaffirm their point 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 rocky seashore 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 a chance to ask questions.
            - If needed, remind them about the questions they brainstormed 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.
- Give hand sanitizer to each student before lunch.
- Give students a five-minute warning before clean up.
- Remind student that we are connected to the ocean through the canyon watershed and that any trash that ends up on the ground here can end up in the ocean so we need to be careful.
- Have students take two minutes to walk around and clean up their area.
- Have students refill water cups.

Assistant Team Lead 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

Self-Reflection

Assistant Team Lead Teaching Notes:

- Help student write their post-it answers if they are struggling.
- While Team Lead reviews how a Gallery Walk works take student post-it responses and put them on the correct pieces of chart paper.
  - Remove any negative responses (i.e. – This was boring, I want to go home, etc.)
  - 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 (7 min)
- Gallery Walk (5 min)
- Debrief (3 min)

Intro & Post-It Writing

- Review why we do reflection
  - Reflection is a part of every Ocean Discovery Institute experience.
  - This is a time for self-reflection.
    - (Show Self Reflection slide.)
    - A time to think about how your thoughts, ideas, and feelings about yourself have changed over time as you learn and experience new things.
    - This is different than thinking about the science you have learned.
    - Self-reflection is about you.

- Reflection Activity
  - In a moment I will show you two sentence frames.
  - You will answer each one on a different colored sticky note.
    - (Project sentence frames from PowerPoint.)
    - (YELLOW) If I wanted to, I could be a science leader because….
    - (BLUE) I can make a difference in the world by…
    - Be sure to use the right color sticky note for each one.
  - You do not need to copy the sentence frame.
    - (Demonstrate this concept.)
  - (Give students 4 minutes to write.)

Gallery Walk & Intro:

- (While the Instructor introduces the Gallery Walk the Assistant Team Lead 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 to find ONE other response you like.
    - This is meant to be a quiet and reflective time.
    - There are two posters for each question, so four posters total.
        - Try to visit all four in the time given.

- Gallery Walk
    - Take students outside allow them to choose a poster and begin.
    - (Give students 3-4 minutes to read.)

<u>Debrief:</u>

- 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!

Surveys

Assistant Team Lead Teaching Notes:

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

Believe Survey (Students)

- (Show Believe Survey slide on PowerPoint.)
- 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 science leaders today. As we end, 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 Team Lead Teaching Notes:

- 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.

Closing and clean-up

- Invite students back to Living Lab for upcoming opportunities.
    - (Show the Opportunities to Return to the Living Lab 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*.

Believe! Achieve! Lead! Go Awesome!

- Thank you for being your best self today science leaders!
    - At Ocean Discovery Institute we **BELIEVE** that science is something you can do and a science leader 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 to watershed plaza.
- 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.

Walking students:

- Take hand-held stop signs.
- Don't forget car keys!
- As you walk, if students are excited about trash, have them point out trash as they walk.
    - Do not let students pick up trash with bare hands.
    - Ask students questions:
        - Where do you think that trash came from?
        - Why do you think people aren't careful about placing trash into trash cans?
        - What could you do about this trash in the future?

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.

Pick up any trash left behind by students.
Sweep trash and food waste.
Empty trash and replace bags.
Ensure rope fence is up.
Close back gate.

4 ECO LAB & SCI-TECH LAB

Put away all supplies in designated storage location.
Turn off SMART Board and return to proper location.
- 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 PLAZA DEL SOL

Spray and wipe tables.
Put chairs on top of tables.

Sweep Plaza Del Sol.
Put away technology.
Lower canopies.
Put animals back in circle tank.
Dry small aquaria before storing.
Take wet towels to laundry room – start laundry cycle.
Put away all supplies in designated storage location.
Take out trash as necessary.

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:

- Ponchos (1 per student)
- Large plastic bins w/ lids for storing/transporting ponchos (4)
- Canopies (1)

1 Pre-Arrival

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

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

- Set up one canopy on the porch of the Eco Lab.
- Place Life on the Rocks experiment under the canopy. Students can watch the experiment from indoors.

2 Arrival

Take out ponchos and bring them to the bus stop.

Greet students and teachers on bus:

- Give each student a poncho to put on on the bus.
- Explain that this is their poncho for the day and they must keep it with them all day.

Take students to their Introduction location and review Believe! Achieve! Lead!

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).
- (Light Rain Days): Move umbrellas from entrance to porch of SciTech Lab.

3 MAKE A DIFFERENCE TODAY

Light Rain:

- Students collect trash wearing ponchos.

Rain/Canyon Flooding concerns:

- Students wear ponchos while collect trash along the sidewalk outside the Living Lab or sidewalk side of Florence Joyner.

4 MAKE A DIFFERENCE TOMMORROW

This station will run the same with the addition of a canopy on the porch of the EcoLab to cover the Life on the Rocks activity.

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

Have students put on their poncho to walk to the bus.
After all students have boarded the bus have an two adults on each bus collect the ponchos and put them in the bins to carry back to the lab.

7 CLEAN UP – POST TRIP

See Clean Up Protocol above.
Spread ponchos out in the SciTech and Ecolab and leave them to dry out.

Activities for Extra Time

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

Rocky Seashore Simon Says:

- Play a couple of rounds of Simon Says using rocky seashore animals.
- Simon Says Directions:
    - An adult starts by saying "Simon says…"
    - Any direction that starts with "Simon says…" needs to be followed.
    - Any direction that does NOT start with Simon says should NOT be followed and any students who DO follow it are out.
    - Example: "Simon says show me a crab." (Students should show crab claw movement.) "Simon says show me low tide." (Students should show low tide movement.) "Show me high tide." (Any student showing the high tide movement would be out and should sit down.)
    - Continue to play until only one student is standing. This student can be the next leader of the game.

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.

Charades

- The team lead 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 team lead.
    - Idea Bank (ideas should ideally tie into the program):
        - Rocky Seashore
        - Wave
        - Ecologist
        - Hermit Crab
        - Snail
        - Anemone
        - High Tide or Low Tide
        - Protect
        - Exploring
        - Question
        - Science Leader

Instructor Background Material

Invertebrate Fact Sheet

Hermit Crabs

- Predator or Prey: Prey
- Living organism adaptation: Hard shell
- Physical environment adaptation: Round body
- They eat: Mussels, plankton, or dead plants/animals (scavengers)
- Eaten by: Birds and larger crabs
- Other information:
    - Have to find a shell to live in because they do not make their own. These shells are left behind from other animals like snails.
    - They do not stay in the same shell their entire lives. When a hermit crab grows too big, it needs to find a bigger shell (like when you grow and need to buy bigger clothes).
    - Sometimes hermit crabs fight over the best available shell available.
- Potential questions:
    - Who do you think makes the shells that the hermit crabs live in? (snails, other invertebrates!)
    - What do you think a hermit crab uses its big claws for?

Sea Stars

- Predator or prey? Both
- Living organism adaptation:
    - They can regenerate their legs as long as enough of their central disc is intact.
    - Spiny skin to protect themselves against predators.
- Physical environment adaptation: Tube feet
- They eat: Other invertebrates like barnacles, mussels, snails, clams or urchins
- Eaten by: Fish, snails, crabs, shrimp, otters, birds and even other sea stars
- Other information:
    - Commonly referred to as starfish but they are not fish.
    - Can evert their stomach to digest prey.
- Potential questions:
    - Why is it helpful that the sea star can regenerate its legs?
    - What part of their body do you think they use to move around the rocky seashore?

Shore Crabs

- Predator or Prey? Both
- Living organism adaptation:
    - Claws (helps as predator)
    - Exoskeleton (helps as prey)
- Physical environment adaptation: Flat body
- They eat: Other invertebrates (like limpets), algae, or dead plants/animals
- Eaten by: Sea otters, fish, larger crabs, octopus, turtles
- Other information:

    - Hard exterior, called exoskeleton, is not made of bone (because they are invertebrates!). When the crab grows too big, it will shed its exoskeleton, like a snake sheds its skin, and grow a new one.
    - Crabs only move sideways and can squeeze into cracks in rocks.
- Potential questions:
    - What do you notice about the color/pattern of this crab? Do you think this an adaptation?
    - What is it an adaptation for?

<u>Wavy Top Snails</u>

- Predator or Prey? Prey
- Living organism adaptation: Hard shell
- Physical environment adaptation: Muscular foot
- They eat: Algae
- Eaten by: Sea stars, octopus, lobsters, and fish
- Other information:
    - Shell helps protect themselves from predators and also helps them keep from drying out in the sun, like a hat or sunscreen.
    - They can close their entire body into their shell and close a “trap door” (operculum) to protect their soft bodies.
    - They can live up to 12 years and are the largest snails in California.
- Guiding questions:
    - What do you notice about the shape of their shell? How is this an adaptation?

<u>Keyhole Limpets</u>

- Predator or Prey? Prey
- Living organism adaption: Hard shell
- Physical environment adaptation:
    - Muscular foot (for sticking)
    - Round body (for waves)
- They eat: Algae
- Eaten by: Birds, sea stars, lobsters, crabs
- Other information:
    - Muscular foot can also help limpet hold on to rocks so predators cannot remove them.
    - The hole on top is where waste is expelled, some people think it is an eye.
    - Eyespots are located near tentacles.
- Guiding questions:
    - What adaptations would an animal need to eat this keyhole limpet?

Sea hares

- Predator or Prey? Prey
- Living organism adaptation: Spits out ink
- Physical environment adaptation:
    - Muscular foot
    - Camouflage
- They eat: Algae
- Eaten by: Sea stars, lobsters, and even some sea slugs (Navanax)
- Other information:
    - This is a type of sea slug. They are related to snails.
    - Have muscular foot to help them move and hold onto rocks.
    - They protect themselves by spitting out purple ink/mucus to confuse their predators, since they don't have a hard shell to protect themselves.
- Guiding questions:
    - Why would a sea hare need to spit out its intestines or shoot out ink?
    - Whys do you think the sea hare is slimy and covered in mucous?

Sea Urchins

- Predator or prey? Prey
- Living organism adaptation:
    - Spines
    - Shell (internal)
- Physical environment adaptation: Tube feet
- They eat: Algae
- Eaten by: Crabs, snails, otters, birds, fish, and even some sea stars (Sunflower star)
- Other information:
    - This is a sea otter's favorite food. Without otters, or other predators like fish and humans, the sea urchins can take over a kelp forest!
    - Urchins will often cover themselves with pieces of shell and algae for camouflage.
- Guiding questions:
    - Why do you think it has spines?
    - What other animals have tube feet? Do you think they are related?

Sea Cucumbers

- Predator or prey? Prey
- Physical environment adaptation: Tube feet
- Living organism adaptation:
    - Releases toxins through skin
    - Eversion and regeneration of guts, sticky and confusing to predators
- They eat: Algae and organic waste on the seafloor (decomposers!)
- Eaten by: Crabs, fish, and sea stars
- Other information:
    - Their false spines to seem scary to predators.
    - They poop out clean sand after they have extracted all the nutrients!
    - Related to sea stars and sea urchins.

    - Can expel some internal organs (gut) to scare off predators. They than regrow these insides!
- Guiding question:
    - What does this animal have in common with its cousins the sea star and urchins? Tube feet!

<u>Chitons</u>

- Predator or prey? Prey
- Physical environment adaptation: Muscular plate to stick to rocks with their armor-like shells to protect them from predators.
- Living organism adaptation:
    - Hard shell (plates)
    - Rolls up in a ball when dislodged from rocks
- They eat: Algae, barnacles, and tiny invertebrates like microscopic plankton
- Eaten by: Sea stars, crabs, fish, sea anemones and seagulls
- Guiding questions:
    - Do you think it is easy for a predator to eat a chiton? Why or why not?

<u>Anemones</u>

- Predator or prey? Predator
- Physical environment adaptation: They grab shells from the environment. These shells act like sunscreen to protect their soft, squishy body from drying out from the sun.
- Living organism adaptation: Stinging cells to eat prey
- They eat: Small fish, plankton and algae
- Eaten by: Sea stars, sea slugs, crabs and larger fish
- Guiding questions:
    - What do you think the anemone uses the shells for?
    - What does the anemone feel like?
    - Why do you think the anemone is moving around your finger?
    - Why do you think the anemone has stinging cells?