

**Intro to Research
Leaders Program**

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SYLLABUS

Ocean Leader Intro to Research Course



COURSE OBJECTIVES



Students will...

- **BELIEVE** that science is something they can do and a scientist is someone they can be.
- **ACHIEVE** in science and think critically.
- **LEAD** in science and conservation to make a difference

COURSE OVERVIEW



We use authentic scientist and community-led research projects to enable students to understand how the Science Discovery Process works and how they may apply it as science leaders. We teach the importance of a growth mindset and provide a series of growth mindset tools to support learning, healthy bodies, and strong hearts and minds.

COURSE LOCATION



Bahía de los Ángeles, Baja California, Mexico

IMPORTANT DATES



San Diego, CA

Launch Night: **July 13th**

Departure & Travel Day: **July 18th**

Travel Day & Return to San Diego: **July 31st**

Family Celebration at the Living Lab: **August 10th**

TYPICAL DAY IN BAJA



Start Time	End Time	Activity
6:00AM	6:30AM	Wake-up
6:30AM	7:15AM	Community Building
7:15 AM	12:25 PM	Field Research
12:30PM	1:00PM	Lunch
1:05PM	1:45PM	Self-Reflection
1:45PM	2:30PM	Siesta
2:30PM	3:55PM	Salud
4:00PM	6:25PM	Know it! Own it!
6:30PM	7:00PM	Dinner
7:05PM	7:35PM	Servant Leadership
7:35PM	8:30PM	Exercise
8:30PM	9:00PM	Sleep Prep
9:00PM	6:00AM	Sleep

Syllabus Timeline

Day	Date	Field Research	Exercise
1	Wed. 7/19	<i>Explore & Wonder</i> Program Goals & Field Station Orientation	Zumba
2	Thurs. 7/20	<i>Explore & Wonder</i> Explore the Bay	Circuit Training
3	Fri. 7/21	<i>Investigate</i> Sea-Level Rise	Zumba
4	Sat. 7/22	<i>Investigate</i> Fisheries	Circuit Training
5	Sun. 7/23	<i>Investigate</i> Whale Sharks	Zumba
6	Mon. 7/24	<i>Analyze</i> Islas	Circuit Training
7	Tues. 7/25	<i>Analyze</i> Wetlands/Sea Turtles	Sea Turtle Monitoring
8	Wed. 7/26	<i>Analyze</i> Recover from Double Research Day	Zumba
9	Thurs. 7/27	<i>Analyze</i> Birds	Circuit Training
10	Fri. 7/28	<i>Celebrate Success!</i> Celebrate!	Zumba
11	Sat. 7/29	<i>Communicate</i> Museo	Circuit Training
12	Sun 7/30	<i>Communicate</i> Community Celebration Preparation	Community Celebration

Preparing a Syllabus Each Year

Create a Draft Syllabus using the below process:

1. Use “Ideal Schedule” below and make adjustments accordingly.
2. Look at previous year’s “Enhancement Notes” for any schedule changes or new projects to be incorporated.
3. Look up tides and create a tide chart (see below).
 - Check tides here: <http://predmar.cicese.mx/calendarios/>
 - Click on Zona marino Bahía de los Àngeles canales de Ballenas y de Salsipuedes
4. Schedule Sea-Level Rise project first.
 - Best choice is a day when low tide is around 8AM-10:00AM and the low tide is less than 1 foot.
5. Explore the Bay is always Day 2.
6. Avoid scheduling boat days on the weekends – that is when fishermen are most busy.
7. Fisheries should be scheduled on Day 4 – as it is a strong example of control vs. experiment.
8. Whale shark monitoring should be later in the program (Day 6 or later) because the more comfortable students are in the water the better.
9. Mujeres Con Alas should be scheduled for a Make a Difference Day if possible.

Once the syllabus is created:

- Send to Community Relations Manager and Research Manager for approval.

Once the syllabus has been approved:

- Update curriculum
 - Any research protocols that were switched from the “Ideal Schedule” need to be switched in curriculum before printing.

Field Research “Ideal Schedule”

Day	Overview	Boat or Land	Field Research Protocol	Field Research Location
1	Explore & Wonder	Land	N/A	Field Station
2	Explore & Wonder	Boat	Explore the Bay	The Bay
3	Investigate	Land	Sea-level Rise	Shara’s House
4	Investigate	Boat	Fisheries	TBD by Hector
5	Investigate	Boat	Cactus Survey/Isamo’s Research	Coronado
6	Analyze	Boat	Whale Shark Monitoring	TBD by Vanessa
7	Analyze	Land	Wetlands	Punta Arena
7 (Evening)	Make A Difference	Land	Sea Turtle Monitoring	TBD by Erika
8	N/A	N/A	N/A	N/A
9	Make a Difference	Land	Mujeres Con Alas	Punta Arena
10	Celebrate Success	Boat	Celebrate Success	TBD by Vanessa
11	Communicate	Land	Museo	Museo
12	Communicate	Land	Community Celebration	Field Station

2023 Tidal Calendar

Day	Date	Tides (High)	Tides (Low)	Tides (High)
1	July 19	2:16AM (5.6 ft)	8:30AM (0.0 ft)	3:18PM (7.9 ft)
2	July 20	2:50AM (5.6 ft)	9:00AM (0.3 ft)	3:43PM (7.5 ft)
3	July 21	3:27AM (5.6 ft)	9:32AM (0.7 ft)	4:07PM (7.2 ft)
4	July 22	4:06AM (5.6 ft)	10:04AM (1.6 ft)	4:31PM (6.6 ft)
5	July 23	4:49AM (5.2 ft)	10:38AM (2.3 ft)	4:53PM (6.2 ft)
6	July 24	5:41AM (4.9 ft)	11:17AM (3.0 ft)	5:12PM (5.9 ft)
7	July 25	6:59AM (4.9 ft)	12:16PM (3.9 ft)	5:35PM (5.2 ft)
8	July 26	8:49AM (5.2 ft)	1:58PM (4.3 ft)	6:16PM (4.9 ft)
9	July 27	10:23AM (5.9 ft)	4:10PM (4.3 ft)	7:51PM (4.6 ft)
10	July 28	11:20AM (6.9 ft)	5:36PM (3.9 ft)	9:39PM (4.6 ft)
11	July 29	12:06PM (7.9 ft)	6:24PM (3.3 ft)	10:54PM (5.2 ft)
12	July 30	12:49PM (8.5ft)	7:05PM (2.6 ft)	11:55PM (5.6 ft)

Curriculum-Community Relations Matrix

Day	Activity	Community Relations
1-6, 8-11	Exercise (Fitness)	Community Person: Celeste Confirm dates and times: see Syllabus Confirm we will do two rotating activities: Zumba and circuit training
1	N/A	N/A
2	Explore the Bay	N/A
3	Sea-level Rise	N/A
4	Fisheries	Community person: Hector Morales Confirm dates and times: see “Day 4: Fisheries – Field Research” in curriculum. Confirm that Hector and Shara will set traps before research begins. <ul style="list-style-type: none"> • Confirm with Hector that it’s okay to set all the traps (Total of 12 = 6 control and 6 experimental) at the same time in the morning. This will allow all the traps time to soak and collect more fish. Students will not rebait traps after pulling unless Hector wants to fish after. Confirm that Shara will be on Hector’s boat the entire time. Coordinate getting research materials to Hector. Remind Hector to: <ul style="list-style-type: none"> • Add more zipties to each light. • Place three lights on each trap (as backup). • Add flagging tape to the buoys of the experimental traps so they can be recognized from the surface.
5	Cactus Survey	N/A
6	Whale Sharks	Community person: Vanessa Vazquez Confirm dates and times: see “Day 5: Whale Sharks – Field Research” in curriculum. Confirm that Vanessa will bring an additional researcher to work with students. Confirm location for whale shark monitoring day prior & choose matching field trip.
7	Wetlands	N/A
7 (Evening)	Sea Turtles	Community person: Erika Santacruz Lopez Confirm dates and times: see “Day 7: Wetlands & Sea Turtles - Sea-Turtle Field Research” in curriculum.

		<p>Confirm that Erica will do a 30 min overview with students during Know it! Own it! the day before research takes place. Preferred time is 5:50-6:20pm.</p> <p>Confirm location for sea turtle monitoring the day prior.</p> <p>Coordinate with kitchen for dinner to go on this day.* (unless research will allow us to return in time for dinner)</p>
8	N/A	N/A
9	Birds	<p>Community person: Yahaira Torres</p> <p>Confirm dates and times: see “Day 9: Birds – Field Research” in curriculum.</p> <p>Coordinate with kitchen for a late hot breakfast when students return from the field @ 9:45PM.</p>
10	Celebrate Success	N/A
11	Museo	<p>Community person: Carolina Espinoza</p> <p>Confirm dates and times: see “Day 11: Museo – Field Research” in curriculum.</p> <p>Confirm that Carolina will meet with students <u>in the classroom</u> for ~20 min to share history of Museo and herself.</p> <p>Confirm 60 min cleaning projects for 25 students + 8 adults</p>
12	Community Celebration	Confirm with kitchen: food for dinner, snacks for guests, dessert, and special drinks.

Program Overview

Program Goals

Through the program students **BELIEVE** that:

- they can recognize science;
- science is important;
- science, in its many forms, has relevance for their lives;
- they can do science;
- challenges can be opportunities to learn and grow, rather than permanent obstacles;
- a career in science is a possibility for them; and
- they can make a difference;

that they can **ACHIEVE** in science through:

- improved understanding of scientific concepts and the scientific process; and
- achievement of positive academic performance;

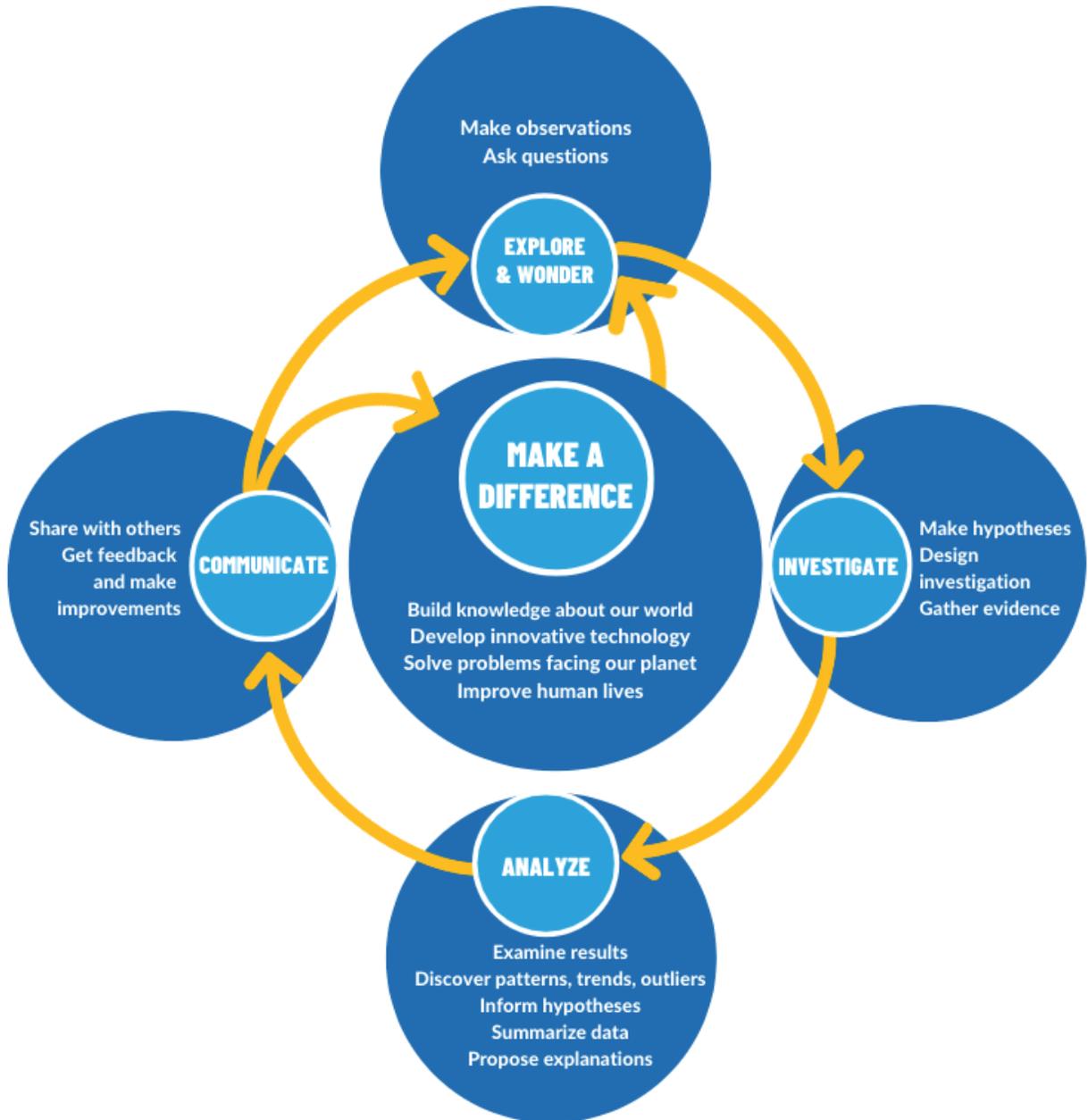
and they are empowered to **LEAD** by:

- taking the necessary steps to pursue and obtain a career in science or science-related fields;
- taking opportunities to use science to make a difference; and
- participating as servant leaders and mentors.

Program Objectives

1. Students experience all aspects of the Science Discovery Process firsthand.
2. Students can name and describe all parts of the Science Discovery Process (see below).
3. Students learn and utilize a series of tools to support a growth mindset.

Science Discovery Process



Ocean Leader Intro to Research Story

We have been Ocean Leaders for over a year now, and it's time to embark on our biggest adventure yet! This summer we travel to Bahía de los Ángeles in Baja, California, Mexico to eat, sleep, and live at a field station and experience how science is done by participating in community research projects.

Each day starts with getting to know my Ocean Discovery community of peers, staff, and mentors better. We eat breakfast together, discuss a daily question, and do a team building activity. After breakfast we prep for the field, and the rest of the morning is research, research, research! Whether we take off from the field station in a van or a boat, I know we are going to experience something amazing and learn about ways people in the community are working to make a difference in the world. One day we swim with whale sharks and learn how the community has been tracking these giant creatures for over a decade, one day we meet a local fisherman and do an experiment to see if we can prevent certain animals from entering his traps, one day we head to a wetland to work with a group of all female science leaders who have been monitoring the bird populations in Bahía for almost a decade, and that's just a few of the research projects we work on. While in the field we also see all kinds of wildlife! Dolphins, sting rays, ospreys, scorpions, and did I already mention... whale sharks?!

After returning from the field and eating a tasty lunch, we have Siesta, a time for me to take a moment for myself for reading, writing, or resting and Salud, a time for me to shower, do laundry or go for a swim. I really need this break because it is HOT here and by early afternoon, I need a nap and some time to relax!

The late afternoon is spent reflecting on what we learned that day in the field and gaining a stronger understanding of the Science Discovery Process. We even get to design our own investigations using paper airplanes! We learn study skills like using flash cards and concept maps to help us memorize new knowledge and make connections to things we already know. All around us are science leader mentors who help us when we get stuck and answer questions about their career and pathway to becoming a science leader. It's so interesting to talk with them!

In the evening, we experience a series of activities like Zumba and circuit training. Zumba is so fun and great exercise! I'm going to have to find a class in City Heights when we get back. When bedtime rolls around, I'm exhausted. I jump into my cot and sleep the night away. Who would have thought I would ever want to go to bed at 9PM??

Throughout these weeks in Baja, I learn about my ability to overcome challenges and the importance of a growth mindset. I believe that I can learn anything I want to with effort and persistence – even things like math and social studies. While each day brings new challenges, I learn that I am more resilient than I ever thought I was. It makes me think that although 10th grade will be challenging, I now have lots of tools that will help me be successful in high school, college, and in life!

I am excited to continue my journey with Ocean Discovery Institute as an Ocean Leader! 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. I can't wait to see what next summer has in store!

Community Building

Overview

Goals: Community building is incorporated into all Ocean Leader programs through the below activities:

- **Food & Conversation:** An informal time to continue expanding their community of support through the shared experience of food and conversation. A daily question is provided.
- **Community Building Activity:** A structured activity designed to build students' belief that they are a unique individual and a member of the Ocean Discovery family and scientific community.
- **Morning Announcements:** Morning announcements are made to introduce new community members, share the day's agenda, and any facility updates.

Timing/Location: 45 minutes

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies (All days):

- "My Plate" poster + easel (1)
- Dry erase markers (3)
- White board spray + rag (1)

Field Research

Overview

Overview: Field Research is one of the main components of the Introduction to Research program. Students experience the Science Discovery Process (see diagram above) by participating in multiple field research projects for a day. Whenever possible, we partner with local scientists and community science organizations to work on ongoing research projects (sea turtle monitoring with Grupo Tortuguero, bird monitoring with Mujeres Con Alas, etc.) or continue work started by Ocean Discovery Institute in years past (Pesca, Wetlands, etc.).

Team Leads and mentors will help students make connections during their field experiences to the Science Discovery Process. Each field experience has a specific focus based on what the students learned about the day prior during Know it! Own it!, however the process is scaffolded and past areas of focus should be reviewed and new areas previewed when opportunities arise.

Goals: Students experience the Science Discovery Process by participating in a series of community-based field research projects.

Supplies: see “General Field Research Supplies Check List” below.

Timing: ~ 3 hours*

*Timing for each research project is listed in the specific Field Research Protocol below.

- Drive time to research location: ~30-60 min
- Collecting Data: ~1.5 -2 hours

Criteria for Creating New Field Research Projects:

- Should be real research and not an activity.
- Pair with community research projects whenever possible.
- Simple to explain the whole project.
- Clear connection to Make a Difference.
- Research can be done in 2 hours (3 hours including travel time).
- Done exclusively in the field.
- Requires no permits.
- Requires little to no prep.
- Not tide dependent.

General Field Research Supplies Check List

- Student Medications
 - Must be checked out from First Aid Station
- AED (1)
- Field gear bag (1/Team Lead)
 - First aid kit
 - Whistle (1)
 - Binoculars (2)
 - Extra Pencils (5)
 - Hand sanitizer (1)
 - Sunscreen (1)
 - Bug spray (1)
 - Snacks
 - Gallon Ziplocs (2)
 - Toilet Paper/wipes
- Full Water Jug (3 large/Team Lead)
- Field Research Supplies
 - See individual field research protocol for list
- Snorkel Supplies* (only if on a boat trip or doing a field trip with snorkeling)
 - Scrunchies (divided by boat)
 - Extra mask + snorkel gear (1/boat)

- Boat Only**
 - Bracelets (1/person)
 - EPIRB (1/Team Lead)
 - Marine radio (1/boat)
 - Boat Safety Kit
 - Orion Flare Kit
 - Air horn
 - Signaling mirror
 - Sashimi Kit
 - Wasabi tube
 - Soy sauce
 - Lime

- Land-based Only**
 - Beach Umbrellas (4/Team Lead)

Field Trips

Overview

Overview: Each Field Research Project is paired with a field trip. Field trips are an opportunity for students to explore some of the natural wonders of Bahía de los Ángeles. Field trips are a time of relaxation and enjoyment and are mostly unstructured.

Goals: Students experience the natural wonders of Bahía de los Ángeles.

Timing/Locations: ~ 1.5 hours*

*Timing will always be dependent on the Field Research project which is always the priority.

**TBD Field Trips should be decided and confirmed with Team Leads the day prior during Prep Meeting.

***Most Field Research Protocols are “paired” with a preferred field trip, however all field trips can be mixed and matched depending on weather and other conditions. Field trips should be close to field research locations to conserve gas whenever possible.

FIELD TRIP “IDEAL” PAIRINGS

Field Research Protocol	Field Trip	Field Trip Activity	Protocols to Utilize
Explore the Bay	The Bay	N/A	Snorkel Protocol
Whale Shark Monitoring	TBD (see list below)**	TBD	TBD
Fisheries	TBD (see list below)**	TBD	TBD
Wetlands	Punta Arena	Beach Fun	Swim Protocol
Sea Level Rise	Shara’s House	Snorkel Fun	Snorkel Protocol
Spider & Cactus	Mitlan	Snorkel Fun	Snorkel Protocol
Islas	Mitlan	Snorkel Fun	Snorkel Protocol
Mujeres Con Alas	Punta Arena	N/A	N/A
Sea Turtle Monitoring	N/A	N/A	N/A
Celebrate Success	N/A	N/A	Snorkel & Swim Protocols
Museo	N/A	N/A	N/A

Field Trip Activities

Snorkel Fun = Formal snorkel tour w/ snorkel buddies

- Students need to be in their snorkel protocol ratios (1 adult:1 student up to 1 adult:3 students)
- Team leads will assess and consider how many rotations will need to occur so that all students can participate based on the number of adults present and student snorkel ratios.

Beach Fun = Swimming, hanging out on the beach, etc.

- Snorkeling is allowed within boundaries set by Team Leads and students must be able to stand up with shoulders showing at any point they are snorkeling.

Salud Box = box of extra beach toys (football, frisbee, etc.)

Celebrate Success/Additional Field Trip Options:

- Piedras Ahogadas
 - Advanced snorkel
- El Rincon (schedule this to be around low tide)
- San Juan Cove
 - Beach Fun (Digging for clams, fishing, etc.)
- Fishing w/ fishermen
- Wildlife watching/Other snorkel locations
- Whale Sharks
- La Mona
 - Beach Fun
- Other trips that haven't occurred yet (due to weather or scheduling)
- Snorkel trips students have really enjoyed and would like to return to.

Self-Reflection

Overview

Overview: Students respond to a series of prompts created by the Writer in Residence to explore their thoughts and feelings and understand the impact of their experiences on themselves as a person.

Goals: Students learn that reflection is a tool to support Strong Hearts & Minds.

Timing: 45 minutes

Location: Palapa/Tables under the eaves

Supplies (All days):

- Rules for Writing (1/student)
- Blank paper (20/student)
- Clipboard (1/student)
- Extra Pencils

Supplies (Day 1)

- Example Chatbook (1)
- Book of reflections from past Ocean Leaders* (1)
 - *contains the piece that the alumni mentor will read on Day 1: Self-Reflection
- Envelope (1/student)

Daily Instructions:

Each day:

- 1) Have students read the Rules for Writing so they become centered and focused.
- 2) Let students know the amount of time they will be writing. Give them a warning when they have 2 minutes left, unless indicated otherwise.
- 3) Let students have silence during the writing time so they can hear the world around them, the birds, wind, background noises. I suggest no music nor talking.
- 4) Provide an opportunity to read what they have written aloud, but never insist. You can also base this on time available. But especially over the course of the two weeks, ask them to share.

Back-up Prompts:

- If at any point you find that you have extra time or students don't seem to be responding well to a particular prompt, below are extra prompts that can be used at any time.
 - This is what I have discovered in Bahia...
 - This is what I discovered about myself...
 - This is what I am wondering...

- What we can do, if we do it together (line from Amanda Gorman's poem)...
- This I believe...
- Write about a lie...
- One day I will be...
- This is the mystery of me....

Know it! Own it!

Overview

Overview: Students connect the morning's research to various parts of the Science Discovery Process, explore each part of the SDP in-depth through lecture and application, and learn a series of tools to record new knowledge, organize it, identify and fill gaps, and recall this knowledge to utilize in new circumstances.

Goals: Students learn and utilize Know it! Own it! growth mindset tools to support their learning through the below activities:

- Analyze and Make a Difference: Students analyze data from the morning's research project and consider how this research could be used to Make a Difference in the world.
- Science Discovery Process In-Depth: Students learn all parts of the Science Discovery Process through short lectures and application activities.
- Paper Airplane Lab: Students design an investigation of their own using paper airplanes applying all parts of the Science Discovery Process.
- Study Time: Students learn study skills (Flash Cards, Concept Maps, and Asking an Expert) while learning how to best utilize their study time.
- Research Preview: Students get an overview of the next day's research project, including the history, research methods, hypothesis, new vocabulary, etc. Students prepare their notebook to be used in the field the next day.

Supplies (All days):

- Projector (1)
- Laptop (1)
- Clicker (1) to advance PowerPoint Slides
- Popsicle sticks w/ student names in a cup (1/set)
- Know it! Own it! PowerPoints (Days 1-12)
- Research Preview PowerPoints (All Days)
- Science Discovery Process poster (1)
- Science Discovery Process Individual Bubble posters (1 of each bubble for a total of 5)
- Community Agreements Poster (1)
- Dry erase markers
 - Black (10)
 - Assorted colors (10)
- Ream of blank white paper 8 x 11" (1)
- Chart Paper w/ sticky back (3 full)
- Blank "Science Discovery Process Concept Map" on 11 x 17" paper (200)
- Student Communication Presentation document (1/pair of students)
- Would You Rather-Question List (laminated) (10)
- Index cards (500)

- Deck of cards (1)
- Manila Folder (1/student)
- Hard-sided File box (1)
 - For storing student folders
- Small plastic art bins for supplies (9)
 - Highlighters (25)
 - Scissors (9)
 - Binder clips (large) (1 box)
 - Simple calculators (3/box)
- Laminated Index Cards with #1-25 (1 set of 25)
 - One number per card
- 10-15 books
 - From ODI library.

Set Up – All days

- Set up Science Discovery Process poster at front of room.
- Set up laptop, projector and screen and project the day's Know it! Own it! slideshow.
- Place reams of paper, index cards, paper clips, manila folders, file box, and box of copies off to the side.
- Set up classroom so students can be in groups of 3 with a mentor.
 - Label each chair or desk with a number between #1-25.
 - Can be done with a post-it note that is taped in place.
- Create a "Finished Early?" chart paper to be hung somewhere in the room.
 - Include suggestions to:
 - Read a book from our library.
 - Journal in your science notebook.
 - Talk to a mentor about their journey to becoming a science leader.
 - Draw or sketch something in your science notebook.
- Set up "library" area.
- Hang up Community Agreements Poster.
- Create a "Cell Phone/Airpod Free Zone" poster and hang.

Mentors:

- Mentors should be utilized heavily during Know it! Own it!
- Ways they can be incorporated:
 - During their first Know it! Own it! mentors will do a two-minute introduction about themselves and their career.
 - Assign them a group to work with during Paper Airplane Lab.
 - Mentors can talk about more nuanced parts of the Science Discovery Process as appropriate (i.e., talk about personal bias, etc.)

- Assign a mentor to each group during Science Discovery Process Application
- Assign a mentor to check in 1:1 students during Study Time.
 - Test students using flash cards.
 - Take three flash cards and create a test question.
 - Ex. The color of the soil changed from dark brown to light gray as we moved from the uplands to the lowlands. This is an example of, a hypothesis, observation, or investigation?
- Have mentors work 1:1 with students:
 - When they are making flash cards
 - Filling in their concept maps, etc.
- Encourage students to utilize mentors during “Ask an Expert”.

Ways To Get Students Moving

- Five-minute stretch break.
- During Pair-Shares use:
 - **Conga Line.** It's a teacher-friendly technique that can be quick or more lengthy and gets kids out of their seats. This is how I implemented it:
 1. Students number off 1, 2.
 2. All 1s stand in a line, and 2s stand face the 1s.
 3. Students use a sentence stem to discuss the question or topic posed. Explicitly assign who will share first (for example, all 1s talk first, then 2s).
 - **Musical Mingle.** This strategy works along the same lines as Musical Chairs.
 - Ask all of the students to stand.
 - Tell them when the music plays they will meander around.
 - When the music stops, they will find a partner to discuss the questions with.
 - You may not repeat partners.
 - Ask students to share their thoughts with the group or to improve listening skills ask them to share their partner's thoughts.
 - **Walk and Talk.**
 - Pair students up and let them walk around the classroom or quad area to discuss.
 - **Circle Toss.** When you have given students information you want them to absorb it can be helpful to do a Check For Understanding (CFU). You can do this with a Circle Toss.
 - Have students stand in a circle.
 - Ask a question – Say a student's name and toss an object to a student. Once the student has caught it they give their answer. Then they can say "(Student Name) – What do you think?" and toss the object to that student.
 - After 3-4 tosses the instructor can ask another question and the last student from the previous question can throw the object to a new student.
 - **Beach Ball Toss.** When it's time for students to share after talking with a partner you can get the energy up with this but be careful this can easily create too much excitement.
 - Once student have had a chance to discuss answers with their partner tell them for the sharing part we will throw a beach ball in the air and play a game of "Keep it up!".
 - The first student who misses shares their response first. Then repeat until you have had as many responses seems appropriate.
 - Another option is that the student who last touched the ball has to share first.
 - **Silent Gallery Walk.**
 - Have students write responses to a question on a post it note or piece of paper.
 - Have students post their responses on 3-4 pieces of chart paper around the room.
 - Let students walk around and read responses.
 - Students can, star responses they agree with and/or respond on the chart paper to what someone wrote.
 - Let students rotate around to all pieces of chart paper.

Evening Programs

Overview

Overview: Students experience different types of physical activity (Zumba and circuit training) in order to provide them with lifelong exercise options.

Location: Quad

Goals: Students learn that exercise is a tool to support Healthy Bodies.

Timing: 7:15pm – 8:00pm

Supplies:

- Speakers + ipod

Ideal Schedule

Day	Exercise	Notes
1	Zumba	Exercise Intro (Day 1 Curriculum)
2	Circuit Training	
3	Zumba	
4	Circuit Training	
5	Zumba	
6	Circuit Training	
7	N/A	Sea Turtle Monitoring in the evening
8	Zumba	
9	Circuit Training	
10	Zumba	
11	Circuit Training	
12	N/A	Community Celebration

* Water fun is always a substitute for Zumba and Circuit training if the weather is too hot.

Day 0: Arrival Day Implementation Agenda

Time	Task	Lead
~5pm	Students arrive! - Show staff where to park vans.	Field Station Manager
	Safe arrival messages - Send "Safe Arrival" text to Isabel & Pre-Trip Safety Meeting Lead.	Program Manager
	Have a wow! moment - Bathroom break. - Walk down to ocean.	Field Station Manager
	Introductions - Facilitate staff, student & mentor introductions.	Program Manager
	Dorm/Shelf Assignments - Students and Mentors	Field Station Manager
	Unload Vans - Students & Staff	Field Station Manager
	Transfer of student passports, visas, notarized letters, receipts, and cash from Team Leads to Program Manager.	Program Manager
6:00 pm	Mentor Meeting - Greet mentors - Provide access to WIF to contact home	Volunteer Manager
6:30 pm	Dinner	Program Manager
7:05 pm	Students unpack and organize shelves	Field Station Manager
7:45 pm	Welcome & Inspirational Talk - See "Curriculum Day 0"	Shara
	Team Lead Meeting - Utilize LI Manual: "Team Lead Arrival Day Protocol"	Field Research Manager
8:00 pm	Preview of Next Day - Review the schedule for the next day & wake-up time.	Program Manager
8:10 pm	Review Sleep prep & expectations - How to set up cots	Program Manager & Field Station Manager
8:30 pm	Sleep prep - See "Program Protocol - Bedtime"	PM Lead 1
9:00 pm	Bedtime - See "Program Protocol - Bedtime"	PM Lead 1

Curriculum Day 0

Set Up

- Write Day 1 Schedule on whiteboard for **Preview of Next Day**.

Welcome and Inspirational Talk

Location: Quad

Goal: Get the student pumped up about this experience and provide context and history of what they are part of.

- Welcome students to the program.
- Give a history of BAHIA program.
 - The start of the program.
 - The location of the program in the community of Bahía de los Ángeles.
 - Past student contributions and what they have resulted in.
 - e.g., Reserve designation, sea turtle conservation worldwide
 - Students who have gone through this program have become leaders who are models for the country.
- (If time allows) Think-Pair-Share:
 - What is something you are excited about for this program? Nervous about?

Preview of Next Day

Location: Quad

Goal: Give students an overview of what to expect for the next day and review wake-up procedures.

- Review schedule for next day.
- Wake-up time is 6AM.
 - You will know it is time to wake-up when hear the “Wake up Playlist” music.
 - It will always start with “Don’t Panic” by Cold Play
- Music will play until bell rings for breakfast at 6:30.
 - By the time the bell rings you will need to have:
 - Put away your bedding and cot.
 - Changed out of your pajamas, brushed your teeth, washed your face, etc.

Day 1: Field Station Orientation

Implementation Agenda

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Overview of Program - See Curriculum: Day 1	Team Leads
8:05 am	Field Station Orientation - Take a group photo of students under Palapa for mentor thank yous.	Field Station Manager
8:35 am	Boat and Waterfront Orientation - Utilize "Water Safety Training Protocol" - Safety Captain prep kayak and life jacket for First Day Snorkel	Field Station Manager
9:05 am	First Day Snorkel - Determine which Team Lead will be Group 1 and which will be Group 2. - Utilize: o Curriculum: Day 1 o First Day Snorkel Implementation Agenda GROUP 1 -or- GROUP 2	Field Research Manager

Group 1: First Day Snorkel Implementation Agenda		
Time	Task	Lead
9:05am	First Day Snorkeling Overview <ul style="list-style-type: none"> ○ See Curriculum: Day 1 	Field Research Manager
9:15am	Review Buddy Pairs <ul style="list-style-type: none"> - Get these from Program Manager before departure 	Field Research Manager
9:20am	Gear up! <ul style="list-style-type: none"> • Attach scrunchies to snorkel and distribute antifog. • Put on wetsuits. • Walk to shore with gear and change into fins. 	Team Lead
9:35am	Perform Gear Check <ul style="list-style-type: none"> • Distribute anti-fog. • Check to make sure your buddy is properly equipped. 	Team Lead
9:40am	Enter Water <ul style="list-style-type: none"> • Field Research Manager enters water first in kayak. • Snorkel buddies enter the water together. <ul style="list-style-type: none"> ○ Stay in shallow water until snorkeler feels comfortable in deeper water. 	Program Manager
	Count students and staff as they enter the water	Program Manager/ Field Research Manager
10:10am	End Snorkel <ul style="list-style-type: none"> • Snorkel buddies exit water together. 	Program Manager
	Count students and staff as they exit the water and confirm total number of students are back on land with Program Manager.	Program Manager/ Field Research Manager
10:15am	KEEP WETSUITS ON. <ul style="list-style-type: none"> • Sit and exchange fins for water shoes. 	Team Lead
10:25am	Facilitate Cleaning Snorkel Gear <ul style="list-style-type: none"> • Collect scrunchies. • Give each student a wetsuit tag. <ul style="list-style-type: none"> ○ Students write first name on tag and attach it to zipper. • Demonstrate how to rinse gear. • Remind students where wet suits dry and where to put away snorkel gear. 	Team Lead
10:30am	Students and Staff Clean & Put Away Gear <ul style="list-style-type: none"> • Drink water. • Reapply sunscreen. • Confirm all gear has been washed and put away 	Team Lead
	Confirm Student Snorkel Levels with all adults.	Team Lead
10:45am	Reflect on 1 st Snorkel in Bahia in classroom <ul style="list-style-type: none"> • How did it feel to do your first snorkel in Bahia? • What did you see? • What is something you would like to see in the future? 	Team Lead
11:10am	Return to Day 1 Implementation Agenda	All

Group 2: First Day Snorkel Implementation Agenda		
Time	Task	Lead
9:05am	First Day Snorkeling Overview <ul style="list-style-type: none"> ○ See Curriculum: Day 1 	Field Research Manager
9:15am	Review Buddy Pairs	Field Research Manager
9:20am	Preview Snorkel in Classroom <ul style="list-style-type: none"> ● Potential questions include: <ul style="list-style-type: none"> ○ How are you feeling about your first snorkel in Bahia? ○ What are you excited about? Nervous about? ○ What should we remember to do when snorkeling? 	Team Lead
9:45am	Gear up! <ul style="list-style-type: none"> ● Attach scrunchies to snorkel and distribute antifog. ● Put on wetsuits. ● Walk to shore with gear and change into fins. 	Team Lead
10:05am	Perform Gear Check <ul style="list-style-type: none"> ● Rinse out anti-fog. ● Check to make sure your buddy is properly equipped. 	Team Lead
10:15am	Enter Water <ul style="list-style-type: none"> ● Field Research Manager enters water first in kayak. ● Snorkel buddies enter the water together. <ul style="list-style-type: none"> ○ Stay in shallow water until snorkeler feels comfortable in deeper water. 	Program Manager
	Count students and staff as they enter the water	Program Manager/ Field Research Manager
10:40am	End Snorkel <ul style="list-style-type: none"> ● Snorkel buddies exit water together. 	Program Manager
	Count students and staff as they exit the water and confirm total number of students are back on land with Program Manager.	Program Manager/ Field Research Manager
10:45am	KEEP WETSUITS ON. <ul style="list-style-type: none"> ● Sit and exchange fins for water shoes. 	Team Lead
10:50am	Facilitate Cleaning Snorkel Gear <ul style="list-style-type: none"> ● Collect scrunchies. ● Give each student a wetsuit tag. <ul style="list-style-type: none"> ○ Students write first name on tag and attach it to zipper. ● Demonstrate how to rinse gear. ● Remind students where wet suits dry and where to put away snorkel gear. 	Team Lead
10:55am	Students and Staff Clean & Put Away Gear <ul style="list-style-type: none"> ● Drink water. ● Reapply sunscreen. ● Confirm all gear has been washed and put away 	Team Lead
	Confirm Student Snorkel Levels with all adults.	Team Lead
11:10am	Return to Day 1 Implementation Agenda	All

Day 1: Field Station Orientation

(Implementation Agenda continued)

Time	Task	Lead
11:05 am	Snack	Team Leads
11:20 am	Community Bingo - See Day 1: Curriculum	Community Relations Manager
11:45 am	Growth Mindset - See Day 1: Curriculum	Team Leads
12:30 pm	Lunch - End of lunch announcement: ○ By the end of “My Two Hands” everyone at the Palapa with science notebook & a pencil.	Program Manager
1:05 pm	Self-Reflection - Play “My Two Hands” (~3 min before 1:05pm) - Utilize “Self-Reflection Day 1” curriculum	Writer in Residence or Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Siesta - See “Program Protocol - Siesta”	PM Lead 1
2:30 pm	Salud - See “Program Protocol – Salud” - End of Salud announcement: ○ By end of “Save the World” everyone at the classroom with science notebook & a pencil.	PM Lead 2
4:00pm	Know it! Own it! - Play “Save the World” (~3 min before 4pm) - See “Know it! Own it! Day 1” curriculum	Field Research Manager
6:30 pm	Dinner - End of dinner announcement: ○ By the end of “Get Up Off of That Thang” everyone meet for Servant Leadership.	Program Manager
7:05 pm	Servant Leadership - Play “Get Up Off of That Thang” (~3 min before 6:35pm) - Utilize “Program Protocol - Chores” - End of Servant Leadership announcement: ○ By the end of “Jump Around” everyone needs to meet for Exercise.	PM Lead 1
7:35 pm	Exercise - Play “Jump Around” (~3 min before 7:15pm) - See “Program Protocol - Evening Activities”	PM Lead 2
8:30 pm	Sleep Prep - Start “Sleep Prep Playlist” - See “Program Protocol - Bedtime”	PM Lead 1
9:00 pm	Bedtime - See “Program Protocol - Bedtime”	PM Lead 1

Community Building Day 1

Timing:

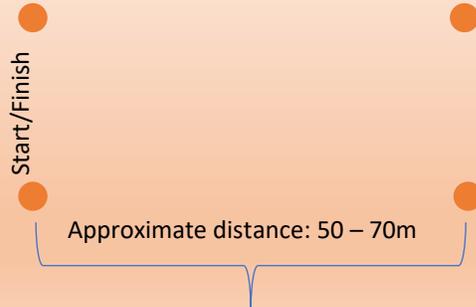
- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- Blindfolds (25)
- Plastic spoons (25)
- Ping-Pong ball (25)
- Small orange cones (4)

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).
- Prep supplies for Community Building Activity.
 - Set up orange cones to create two invisible lines that each team has to cross.



Food & Conversation

Question: What is one thing you are excited about today? Nervous about?

Introduction:

** Introduction should be done after everyone has gone through the breakfast line.*

Purpose of Food and Conversation:

- Build your community of support.
 - Building a community of support is a tool for **Full hearts! Powerful minds!**
 - A community of support is a group of people who will help you on your journey to being a science leader.

- The more people you have to support you when you face a challenge, the easier your journey will be.
- Potential new members of your support network are all around you right now you (mentors, staff, new friends, etc.) just need to get to know them.

Introduce Community Question:

- Getting to know new people.
 - It can feel a bit awkward to start talking to someone you don't know but an easy way to break the ice to ask someone a question.
 - Each day there will be a question on the board.
 - Use this question to help break the ice with new people sitting near you and to learn something new about someone you may already know.
 - (Read today's question out loud.)
 - Take some time to ask the people around you this question and spark some conversation!

Community Building Activity: Trust Race!

Overview: Building trust between Ocean Leaders, mentors, and staff.

Introduction:

- Each day after breakfast we will do a short community building activity to allow us all to get to know one another better.
- Today we will be participating in a partner race.
 - Each team needs to carry a ping-pong ball on a spoon from one side of the field to the other.
 - The catch? The person carrying the spoon with the ping-pong ball will be blindfolded and the other team-member will have to guide them to the other side!
- Expectations:
 - Each team of two will choose one person to be blindfolded and the other person will be the guide.
 - The blindfolded person must carry the ping pong ball on their spoon without touching it to the other side. The guide may not physically touch their partner but can do anything else to help guide their partner to the other side.
 - Once on the other side, team mates must switch roles and must get their ping pong ball back to the other side.
 - Blindfolds must be worn with a triangle over the face (demonstrate this).
 - If a ping pong ball falls off the unblindfolded member must replace it on the spoon before their teammate can move again.

Activity:

- Divide whole group into pairs (include mentors, staff, etc.).
- Line everyone up on the "Start" side.

- Have each pair blindfold one member.
- Give each blindfolded person a spoon and ping pong ball.
- When everyone is ready, yell “Go!”

Debrief:

- Potential Questions:
 - Which roll was harder? Being blindfolded or being the guide? Why?
 - Why do you think we would do an activity like this?
 - What could you and your partner do before hand to make getting to the other side easier?

Morning Announcements:

- Review daily schedule and any boat/snorkel groupings.
- Review gear for the day:
 - Wear: a swimsuit, water or closed-toed shoes, hat, sunglasses, short/long sleeves.
 - Science notebook and pencil.
 - Fill and bring a water bottle.
 - Apply sunscreen.
- Musical cues
 - We will review musical cues in-depth later today.
 - You have 10 minutes to prep.
 - You need to be in the classroom by the end of “xx” song, when it begins, you have ~2 minutes to get to the classroom.

Curriculum Day 1

Supplies:

Overview of Program

- Science notebooks (1/student)
- Pencils (1/student)
- Introduction to Research Story (1/student + 6 mentors)
- Group Name Stickers (1/student + 1 mentor + 1 Team Lead):
 - Tierra y Mar Group
 - Olas y Islas Group* (only if there will be two separate groups)
- [Ocean Animal stickers](#) (~50)
- Other Animal stickers (~50)* (only if there will be two separate groups)

First Day Snorkel

- Anti-fog (1)
- Student snorkel gear (1 set/student)
- Wetsuit (1/person)
- Scrunchies (1/person)
 - Need eight different colors (3 of each color)
- Extra snorkel gear
- Kayak + Paddle (1)
- PFD (1)
- Whistle (1)
- Sunscreen (1)

Community Bingo Supplies

- Bingo cards (laminated) (1/student)
 - How to create bingo cards:
 - Use “BLA Community Relationships and Gifts” for the current year to identify who to include as part of the Bingo game to orient students to the community partners.
 - Papi://LI/Summer Programs/Ocean Leader Intro to Research Program/Community Relations/Communications
 - Hide all columns between “Full Name” and “Bingo + Role”.
 - Filter by “Bingo + Role” select all, except for “blanks”.
 - Include a photo, full name, and the role identified in the “Bingo + Role” column. If you don’t have a photo in our files, use social media.
 - Past photos can be found: Papi:// LI/Summer Programs/Ocean Leader Intro to Research Program/Community Relations/Community Bingo/Community Member Photos
 - Use Canva to create Bingo cards.
 - Each card should include all community partners.
 - Make at least five different versions of the bingo card by randomizing the order of the pictures.
- Community Bingo PowerPoint

- How to create PowerPoint:
 - Open “Ocean Discovery Widescreen PPT Template”.
 - Do a Save As and rename to “Community Bingo PowerPoint 20xx”.
 - Save in **Community Bingo Folder**: Papi:// LI/Summer Programs/Ocean Leader Intro to Research Program/Community Relations
 - Use the photo, full name, and role you used to create the bingo cards to create a slide for each person.
 - Archive the previous year’s Community Bingo PowerPoint and Cards.
- Dry erase marker (1/student)
- Prizes (5-7)

Growth Mindset

- Growth Mindset Article (1/student + 1/mentor)

Salud Supplies

- Buoys to make swim boundary
- Laundry detergent
- Kayaks
- Paddleboards
- Floating mat
- Footballs
- Frisbees
- Board games
- Spa day supplies (essential oils, things from the kitchen, facemasks)

Set Up

- Set up Science Discovery Process poster at front of room.
- Write program goals on the whiteboard (see curriculum below).
- Set up the classroom so there are enough seats for every student AND mentor to sit.
 - Mentors should be seated amongst students NOT off to the side.
- Give every seat a student will be sitting in a number (tape a post it or index card, etc.).
- Each time students enter the classroom give them a physical number that corresponds to one of the seats.
 - Goal: to mix students up so they are interacting with different students throughout the 12 days.
- Tell each mentor which seat to sit in.
 - Goal: mentors should be with small groups of students so they can interact throughout the classroom time.

Overview of Program

Location: Classroom

Timing

- 0:00 – 0:10 Intro to Research Story & Program Goals
- 0:10 – 0:20 Community Agreements & Daily Schedule
- 0:20 – 0:30 Science Notebook & Field Ready
- 0:30 – 0:40 Team Names

Intro to Research Story & Program Goals

- Welcome everyone to the classroom space
 - We will meet here every afternoon for Know it! Own it! and every evening for Evening Lecture.
- Introduction to Research Story
 - Let's start by getting a feel for what we will be doing in during this program by reading a story.
 - Have everyone read over and annotate the Introduction to Research Story (**SLIDE**).
 - Circle 2-3 things you are excited about.
 - Put a "?" next to anything you have questions about.
 - (Give everyone 3-4 minutes to read and annotate story.)
 - Pair-Share (**SLIDE**):
 - One thing I am excited about is...
 - Something I have a question about is...
- Review Program Objectives (**SLIDE**)
 - You will experience all aspects of the Science Discovery Process firsthand through community science research projects.
 - You will participate in a variety of research projects that will expose you to all parts of the Science Discovery Process.
 - These research projects are all community based and focus on how the people of Bahía de los Angeles are making a difference for their community and the world.
 - You will be able to name and describe all parts of the Science Discovery Process.
 - You will experience the Science Discovery Process start to finish by doing your own experiment.
 - You will learn and utilize a series of tools to support a growth mindset.
 - Having a growth mindset allows us to face and overcome challenges in our lives, our goal is to give you a set of tools that will help support having a growth mindset.
- Science Leaders
 - When participating in these research projects you will meet many science leaders.
 - Define Science Leader (**SLIDE**)

- Are people of any age who use science to make a difference in their community and our world.
- Develop ideas to help solve problems facing our planet, improve human lives, and make our world a better place.
- Study science or have careers in science and science-related fields.
- Highlight that science leaders are “people of any age” who use science to make a difference in their community.
 - Anyone who has done an Ocean Discovery program in school has helped make a difference by picking up trash, creating a trail lined with rock art in the canyon, planted and ziplined seeds for restoration, etc.
 - You are already science leaders and you will meet many more science leaders during your time in Baja.

Community Agreements & Daily Schedule

- Review Community Agreements (**SLIDE**)
 - Be Your Best Self.
 - Be curious.
 - Be respectful.
 - Be safe.
 - How do you think things will be different as we live, eat and work together?
- Cell Phone Policy (**SLIDE**)
 - Our time in Bahia is special.
 - We want to be making personal connections with each other, our mentors, new friends and nature.
 - It is a rare opportunity to disconnect from our technology and be present.
 - Cell phones can only be used:
 - In airplane mode for picture taking during Field Research.
 - During Siesta w/ headphones.
 - Headphones/airpods
 - No headphones/airpods at the field station (except during Siesta).
- Daily Schedule (**SLIDE**)
 - Review daily schedule
 - Walk students through a typical day.
 - Flow of the days is field research in the mornings followed by Growth Mindset tools in the afternoon.
 - Cues (**SLIDE**)
 - Bell:
 - Meal time!
 - Music:
 - You will have transition time between activities.
 - We will play a song to let you know when the transition time is ending.
 - You will need to be at the location of your next activity with all the supplies you need by the time the song ends.
 - Example: Starting tomorrow after morning announcements you will have ten minutes to get ready for the field and report to the classroom. When you hear the song “The World Is Ours” that is

- your cue that you have three minutes left to get to the classroom with all your gear.
- Example: Later today after Salud you will hear the song “Save the World”. That means you have three minutes to get to the classroom with your science notebook and pencil, AND be in your seat before the song ends.
 - Don’t wait until the last minute or you may not be able to get into the classroom because several people are trying to get in at the same time.
 - We will have musical cues for the following:
 - Wake up Playlist
 - Field Research
 - Self-reflection
 - Know it! Own it!
 - Servant Leadership
 - Exercise
 - Evening Lecture
 - Bed Prep Playlist
 - We will help you get used to all these new musical cues over the next couple of days so don’t worry!
- Tardy
- The music cues are there to help you arrive to activities on time.
 - Because we are a community, it is important to realize that we rely on each other to be successful.
 - Part of being successful means that we arrive on time to all activities.
 - Help each other out during transitions so that everyone can be on time.
 - If you are late for any activity, you will be marked late on the Tardy Board which Anne showed you during the field station orientation.
 - Anyone listed on the Tardy clipboard will need to give back to the community during Salud time.
 - To give back to the community you will perform some servant leadership chores during Salud.
 - The Salud captain will assign these to you.

Field Ready & Science Notebook

- Field Ready:
 - Part of being ready for Field Research each day means being “Field Ready”.
 - After Community Building, you will have 10-minutes to get field ready and report to your classroom.
 - To be field ready you need to (**SLIDE**):
 - Wear:
 - swim suit
 - sunglasses
 - hat
 - short or long-sleeve shirt (no tank tops)
 - sunscreen

- close-toed shoes
- In your backpack:
 - Filled water bottle
 - Science notebook
 - Pencil
- Some days we will be on boats, and you will need to bring these additional items:
 - Life jacket
 - Snorkel gear (mask, fins, snorkel)
 - Wetsuit
 - Optional: water shoes, towel
- Science Notebook (**SLIDE**)
 - Your science notebook is a tool.
 - A place to record any observations, ideas, or questions you have.
 - There will be things you need to record as part of your field research experiences but you can use your science notebook at any time.
 - Your science notebook will be yours to keep at the end of this experience.
 - You will need your science notebook each day during:
 - Field Research
 - Know it! Own it!
 - Evening Lecture
- (Give each student a science notebook.)

Team Names

- Share Team Names
 - (Break students up into group by Team Lead and find quiet space for your group to gather.)
 - Share your group name and the meaning of your name Tierra y Mar.
 - Tierra = land
 - Mar = sea
 - (Give each member of your group a sticker to place on their water bottle.)
 - Choose an animal sticker to represent you.
 - Everyone will choose an animal sticker and explain to the group why/how they chose that animal to represent them.
 - (Place animal stickers at center of each group.)
 - (Give students 1-2 minutes to think.)
 - (Use popsicle sticks to choose the 1st name – let them choose an animal and explain why they chose it.)
 - (Repeat by pulling another popsicle stick until they are no more left.)
 - (Have all students put stickers on their water bottles – this is the easiest way to identify your water bottle.)
 - (Extra stickers will become prizes for Community Bingo.)

First Day Snorkel

Overview

Introduction to Snorkeling

- Today will be our first snorkel in Bahia.
- Remind student they have had swim and snorkel practice to prepare for this.

Introduce additional staff members and their roles:

- Field Research Manager – Safety Captain
 - Ride in kayak to provide a boundary parallel to shore.
 - If you need help, they will be there to help you.
 - First in and last out of water.
- Program Manger - Extra Snorkeler
 - If anyone needs additional support this person will be ready to jump in the water and work with you.

Expectations

- We will be snorkeling near the shore.
 - Stay within buoy marker boundaries.
 - I will be on a kayak if you need help.
- Review use of hand signals to communicate:
 - Ok sign – I'm okay (close to person asking)
 - Fist on top of head – I'm okay when further away
 - Waving hands out of water – I need help
 - Don't wave to people in the water – it can look like you are asking for help.
- Always stay with your buddy.
 - Stay within arm's reach at all times.
 - If you want to try diving down, let your buddy know.
- Take your time!
 - Snorkeling is not a race. The slower you go the more you are likely to see.

Equipment

- Wetsuit.
 - Demonstrate how to put on.
 - Zipper to the back.
 - Should be tight – this is what keeps water in the wetsuit and allows your body to heat it up, keeping you warm.
- Mask/Snorkel & Scrunchie.
 - You will have matching scrunchies on your snorkels so you can identify each other in the water.
 - Demonstrate where scrunchie goes.
- Anti-fog in mask.
 - Before you get into the water, we will put a few drops of anti-fog into your mask.
 - Try not to let your mask get wet BEFORE you put the anti-fog in or it won't work as well.
 - Rub the anti-fog around so it coats the entire inside of your mask.

- Give it a couple of seconds to dry.
- Rinse your mask in the water before putting it on.

Getting to/from the water

- Shoes are required anytime you are on the beach.
- Getting into the water:
 - Walk to shore with water shoes on, flippers, mask, and snorkel in hand.
 - Sit and trade your water shoes for fins.
 - Walk backwards into the water with your buddy using the sting-ray shuffle.
 - Do not try to walk forward in fins.
- When in the water always use the sting-ray shuffle.
 - Demonstrate sting-ray shuffle.
 - Sting rays feel the vibrations we make by shuffling and move out of the way – prevents us from stepping on them accidentally.
- Returning to the shore:
 - Walk backwards with fins on towards your shoes.
 - Sit and change your fins for water shoes and walk back to station with fins in hand.

Community Bingo

Location: Classroom

Timing:

- 0:00 – 0:05 Intro
- 0:05 – 0:25 Play Bingo

Intro

- It is important to get to know the people in the community of Bahia as we will be working with them and living with them for the next couple of weeks.
- To help us get to know some of the people we will play Community Bingo.
- Review the rules of Bingo.
 - Each person will have a Bingo Card with the names and pictures of people from the community.
 - I will tell you a little bit about each person – when she reveals their name- if you have that person on your bingo card you put an “x” through them with your dry erase marker.
 - Determine the type of Bingo game you want to play (line wins, four-corners, black-out, etc.) and explain that version to students.

Play Game

- Give some general facts about a person, then reveal who they are on the PowerPoint.
- Students can then put an “x” through that person if they have them on their bingo card.
- If a student gets “Bingo” let them choose a prize.
- Play as many games as necessary to get to know all the people in the PowerPoint.

Growth Mindset

Location: Classroom

Timing:

- 0:00 – 0:10 Overview & Read Article on Growth Mindset
- 0:10 – 0:20 Discuss Article on Growth Mindset
- 0:20 – 0:30 Growth Mindset Overview

Overview

- One of the things we want you to focus on as an Ocean Leader is having a Growth Mindset.
- Define Growth Mindset (**SLIDE**)
 - Growth Mindset: means you believe your intelligence, abilities, and skills can be developed over time through dedication and hard work and challenges are an opportunity to grow.
 - Having a growth mindset is important because science research tells us that people with a growth mindset (**SLIDE**):
 - Learn more things – better and faster
 - take on more challenge and persist through more challenges
 - see failures as an opportunity to learn and try something new

Read article on Growth Mindset

- We are going to read a short article about the science behind growth mindset and why it is important.
- When reading (**SLIDE**):
 - Students should underline two things they think are interesting.
 - Students should put one “?” next to something they don’t understand.

Discuss article on Growth Mindset

- Think-Pair-Share (**SLIDE**):
 - One thing I found interesting in the article was...
 - I think having a growth mindset (would/would not) be an asset because...
 - I think I have a (growth/fixed) mindset because...

Growth Mindset Overview

- Review Fixed vs. Growth Mindset (**SLIDE**)
 - Growth Mindset:
 - You can change.
 - You can get better at things with hard work.
 - Challenges are opportunities.
 - Fixed Mindset:
 - You are born with a certain intelligence.
 - You can’t change how “smart” you are.
 - When you aren’t good at something you can’t get better.
 - Give an example: I’m bad at Math.

- Growth Mindset Continuum (**SLIDE**):
 - Most people aren't completely on one side or the other of the continuum.
 - Many people may have a fixed mindset about certain subjects – reading, fixing cars, etc. while having a growth mindset about something else – ability to cook, play soccer, etc. This is normal.
 - It's good to check in with yourself about where your mindset is on different things so you can begin to identify areas where you have a more fixed mindset.
- Science behind a Growth Mindset:
 - Your ability to learn new things, improve your skills, get better at things that are challenging is absolutely true and real – and proven by science!
 - Science has shown our brains are plastic – meaning they can change and grow over time. (**SLIDE**)
 - We have trillions of neural pathways in our brain.
 - These neural pathways are things we have learned (from walking to riding bikes to reading to learning to paint, etc.).
 - When we learn something new or connect something new to something we already know we are laying down new neural pathways = we are learning.
 - People with a growth mindset believe they can create more neural pathways and learn more by challenging themselves and working hard when things are difficult. And they are right! (**SLIDE**)
 - The amazing thing about a growth mindset is that anyone can develop a growth mindset even if you've had a fixed one in the past. (**SLIDE**)
 - All of us can add more neural pathways in our brain, we just need to realize that sometimes it is easier for put these pathways down than others.
 - When things are difficult or challenging to learn we shouldn't give up because everyone is capable of creating more neural pathways with hard work.
 - Having a growth mindset can help in all aspects of our lives, not just school. (**SLIDE**)
 - You can have a growth mindset about, your ability to play sports, cook, read, be artistic, etc.
 - It's possible to have a growth mindset about all these things and many others.
- Introduce Growth Mindset Tools
 - To have a growth mindset you will need tools that can help you meet some of the obstacles and challenges you will face.
 - We will teach you tools during your time in Baja to help support having a growth mindset.
 - We categorize these tools into three different groups.
 - Tools to support (**SLIDE**):
 - Learning (Mantra: Know it! Own it!)
 - Mental Health (Manta: Full Hearts! Powerful Minds!)
 - Physical Health (Mantra: Healthy Bodies! Higher Goals!)
 - Try to think of each of these tools like tools in a toolbox. They are tools that can be helpful when you encounter a challenge or an opportunity in your life.

- Review Growth Mindset Practice
 - How can you apply a Growth Mindset?
 - You have already been practicing using a growth mindset during your coaching conversations!
 - Let's take a look at the Growth Mindset practice we use at Ocean Discovery (**SLIDE**).
 - Identifying the challenge.
 - Recognizing when something feels difficult or challenging.
 - Realize that you **CAN** overcome a challenge or obstacle and that this is an opportunity to grow and learn.
 - Determining Tools to Use
 - Knowing the Growth Mindset Tools that you have in our toolbox.
 - Determine which one(s) to use.
 - Using the tools.
 - Apply the tool or tools you choose.
 - This is where the hard work comes in.
 - You need to have grit and know that this won't always be easy but if you keep working at it you will overcome the challenge.
 - Reflecting.
 - After applying the tools and working hard – what happened?
 - You were successful. Reflect:
 - How do you feel?
 - What worked well to overcome that challenge.
 - You were not successful. Reflect:
 - What didn't work? Why do you think it wasn't working?
 - Do you need a new tool or more time with the same tool?
 - If necessary, determine new tools to address the challenge.

Self-Reflection Day 1

Supplies:

- Example Chatbook (1)
- Book of reflections from past Ocean Leaders* (1)
 - *contains the piece that the alumni mentor will read on Day 1: Self-Reflection
- Blank sheet of paper (1/student)
- Envelope (1/student)
- Rules for Writing (1/student)

Self-Reflection Overview

- Reflection is another tool for having a Growth Mindset – to support having a Strong Heart & Mind.
 - Use Manta: Full Hearts! Powerful Minds!
- Reflection is a tool that can help us build strong hearts and powerful minds to deal with the stresses that life throws at us.
 - Reflection allows you time to think about, process, and share thoughts and feelings about how an experience is impacting you – like your time here in Bahia.
 - It allows you time to find your voice and speak your mind.
 - An opportunity to exercise your imagination, create your dreams, discover new ideas, and wonder about the future.
- We will practice using the tool of self-reflection every day of this program, but taking time to reflect is a powerful tool that can be used throughout your life.

Introduce Book of Reflections:

- One goal we have is to create a Reflection Book by your senior year.
- This Reflection book will contain 1-2 pieces by you which will represent part of your journey to becoming a science leader.
- (Introduce Alumni Mentor)
 - (_____) is going to share some of their own reflections from the book they helped to create.
 - (Alumni chooses 1-2 pieces to read out loud to the group.)

Introduce Chat Book

- This year we will be working during this time to create a less formal book of reflections called a chat book.
- It will have the feel of yearbook, with photos, quotes, and reflection pieces by each of you.
- We will spend each day here writing.
- Late next week you will choose and edit a piece you want to include in the chat book of reflections.
- For this week we will simply focus on reflecting and writing about our experiences.

Rules for Writing

- (Pass out a copy of the Rules for Writing to each student.)
- Have students take turns reading the rules out loud.
- *This helps to settle and center them in their space.*

Writing

- Each day in Bahia and you will learn more about the world and yourselves than you probably expected.
- Writing is often hard because we worry about saying the right thing, and we worry about what to put on the blank page.
- Reflection is about learning to not worry about the blank page, but to start with what comes to you even if it feels unrelated to what you thought you were going to write or wanted to say. If you put your thoughts down on the page without spending anytime thinking about what to say, you can let your imagination guide you on how to say it.
- You can use this skill when you are in college and not sure where to start your research paper, you can use it when writing an email to apply for a job, and you can use it when you are writing a speech to give to your graduating class.
- Write your first thoughts and feelings. You can go back and edit later. But the truth of what you want to say, what is *your* truth is in those first thoughts, so put them on your page before your mind tricks you into thinking it should be something else.
- Be brave.

Letter to Yourself

- Today you will write a letter to your future self.
- To help you write the letter, I will give you sentence stems which you will copy and then complete with your own thoughts and ideas.
- (Give each student a blank piece of paper.)
- Write today's date at the top of the page.
- Write the below prompts on the board one at a time. Students will copy each line into their letter and then complete the sentence stem. After the two minutes are up, write the next line on the board. The goal is for students to focus on one prompt at a time.
 - Dear [Your Name],
 - Today was my first day in Bahia.
 - Before we left San Diego, I imagined... [2 minutes]
 - Yesterday, when we first arrived at the field station, I thought... [2 minutes]
 - When we started in the morning, I felt... [2 minutes]
 - But when I look back on my day, I know... [2 minutes]
 - The one thing I will always remember... [2 minutes]
 - Tomorrow, I'm looking forward to... [2 minutes]
 - Sign off on your letter, with your signature.

Collect letters

- (Hand out an envelope to each student.)
- Have students fold their letters and seal them inside the envelopes
- Have students write their names on the outside.
- Collect all the envelopes from the students.

Know it! Own it!

Day 1: Asking Questions & Making Observations

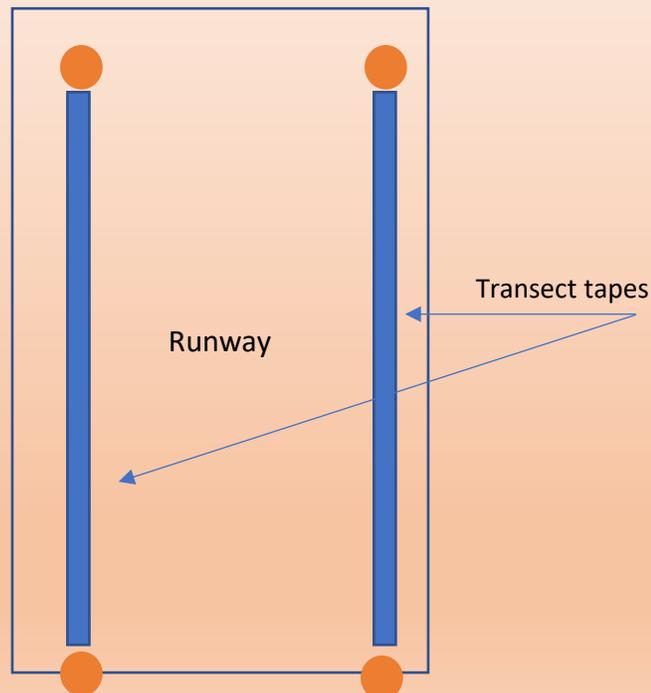
Logistics

Supplies:

- Would You Rather-Question List (laminated) (10)
- Laminated Index Cards with #1-25
- 100m transect tape (4)
- Small orange cones (8)
- Vocabulary stickers (1 of each/student)
 - Observation
 - Question

Set Up

- Ask mentors to stay after Know it! Own it! for five minutes so you can go over their roles during this portion of the program.
- Create two “runways” for paper airplane testing (see diagram below).
 - For each runway:
 - Set up two orange cones for front of runway and two for end.
 - Set up two 100m transect tapes along the left and right side of the runway.



Timing

Time	Activity/Location	Breakdown
25 minutes	Know it! Own it! & Mentors	4:00 – 4:05 Know it! Own it! Overview 4:05 – 4:15 Mentors & Interacting w/ a Mentor 4:15 – 4:25 Getting to Know Each Other
30 minutes	Science Discovery Process In-Depth	4:25 – 4:35 Goals & Science Discovery Process Overview 4:35 – 4:45 Make a Difference & Explore and Wonder 4:45 – 4:55 Application of Science Discovery Process
60 minutes	Paper Airplane Lab	4:55 – 5:00 Share Goals & Paper Airplane Lab Overview 5:05 – 5:15 Design a Paper Airplane 5:15 – 5:25 Testing Zone 5:25 – 5:30 Observations/Questions 5:30 – 5:35 Redesign 5:35 – 5:45 Testing Zone 5:45 – 5:50 Observations/Questions 5:50 – 5:55: Debrief
30 minutes	Preview Research	5:55 – 6:00: Prior Knowledge 6:00 – 6:10: Explore the Bay 6:10 – 6:15: Notebook Prep 6:15 – 6:20: Review Field Ready 6:20 – 6:25 Clean-up

Lesson

When students enter the room:

- Hand each student a laminated index cards with a number between 1-25.
- This is the location where they will sit.
- Try to mix students up so they aren't sitting with friends but meeting new people.
- Assign a mentor to sit with each group.

Know it! Own it! & Mentors

Know it! Own it! Overview:

- Welcome students to Know it! Own it!
 - Welcome to our space.
 - We are here every day from 4 – 6:25PM.
 - Review Community Agreements.
 - Review Cell Phone/Airpod Free Zone!
 - If you have them today – just put them away.
 - Don't bring them any other days.
 - Review "Finished Early?" chart paper.
 - Point out library.
- Overview.

- Earlier today you talked about growth mindset, the advantages of having a growth mindset, and the way we group tools that you can use to help support having a growth mindset.
 - We group growth mindset tools into three categories:
 - Physical Health
 - Mental Health – tools like self-reflection, siesta, and salud for example
 - Learning
 - Know it! Own it! is our Mantra for Growth Mindset tools related to Learning. **(SLIDE)**
 - This is a time for us to take new knowledge and Know it! (point to head) and Own it! (make a fist).
 - Each day of Know it! Own it! will be broken up into five parts **(SLIDE)**:
 - Analyze & Make a Difference: We will analyze the data we collected during our morning research and consider how that research is being used to make a difference in the world.
 - Science Discovery Process In-Depth: We will learn about a new part of the Science Discovery Process in-depth.
 - Paper Airplane Lab: We will apply our knew SDP knowledge to design and conduct our own experiment using paper airplanes.
 - Study Skills: We will learn and practice some tools for remembering and recalling new knowledge.
 - Research Preview: We will learn about the research project we will be participating in the following day and prep our science notebook for the field.
- Growth Mindset.
 - Let's take a moment to think about our mindset as it relates to our ability to learn new things in science.
 - Think-Pair-Share **(SLIDE)**:
 - Where you think you fall on the growth mindset continuum when it comes to learning science?
 - Wherever you are on the growth mindset continuum is okay.
 - If you are on a more fixed mindset side, try to identify any challenges that come up for you today while talking about science.
 - The goal of Know it! Own it! is to give you tools that can help you when you come up against a challenge or an obstacle in learning.
 - We want you to be able to know that you have three tools you can use when you are struggling to learn a concept in science for example.

Mentors

- Believe it or not, your first tool is already sitting in this room! – Your mentors!
 - Mentors will be joining us during Know it! Own it! and will be part of everything we do here.
 - Let's review what a mentor is and how you can interact with a mentor.

- Review - what is a mentor (**SLIDE**)?
 - Have students brainstorm ideas about what a mentor is and what they do.
 - (Write some responses on the board.)
 - Define: a mentor is an experienced person who can give advice. (**SLIDE**)
 - Break down definition.
 - Experienced: someone who has gained knowledge over a period of time.
 - Advice: guidance or recommendations regarding future action.

- Your mentors.
 - Your mentors are successful science leaders who have experience in many things such as graduating high school, choosing and attending college, working & having a career in science or a science-related field, etc.
 - Your mentors are amazing people who volunteer their time because they BELIEVE in you and your ability to become a science leader!
 - We have two types of mentors:
 - Scientist mentor – a person who currently works in a science field
 - Alumni mentor – a person who is an Ocean Leader and participated in Ocean Leader programs (alumni may also be science mentors).

- Ask each mentor to introduce themselves and give a brief 2-minute description of their current career.

- What do you do with a mentor (**SLIDE**)?
 1. **Learn about their pathway to becoming a science leader.**
 - Review definition of a Science Leader
 - Are people of any age who use science to make a difference in their community and our world.
 - Develop ideas to help solve problems facing our planet, improve human lives, and make our world a better place.
 - Study science or have careers in science and science-related fields.
 - Be sure to ask your mentors about being science leaders!
 - Have students brainstorm questions for science and alumni mentors.
 - Examples (write these on a whiteboard that can be referenced):
 - How does the work you do make a difference in the world?
 - Where do you/did you go to college? What do you like about it? Dislike?
 - What was challenging about going to college?
 - What do you enjoy about your job?
 - What was one challenge you faced on your pathway to becoming a scientist?
 - In what way has Ocean Discovery Institute helped you?
 2. **Get help.**
 - Understanding the Science Discovery Process or any research we are doing.
 - Help with your experiment.

- Understanding tools we learn and use during Know it! Own it!
- Any questions related to content!
- 3. **Have a Growth Mindset conversation with them.**
 - Are you facing a challenge? Are you having a fixed mindset about something?
 - Ask a mentor to talk it through with you.

Interacting with a Mentor

- Where and when can I talk to a mentor (**SLIDE**)?
 - Anytime! They are here because they want to help, want to get to know you, and want to share some of their life experiences with you.
 - You can talk to ANY mentor.
 - Meals and evening activities are a great time to sit down with a different mentor and ask them about themselves.
 - Salud – grab a spot in the shade and have a conversation!
 - During Know it! Own it! - if you don't understand something you are doing or need help. Reach out!
- Mentor-Mentee Relationships (**SLIDE**)
 - You should always feel safe and be safe.
 - Discuss boundaries:
 - It is important to remember that any mentor-mentee relationship should be comfortable.
 - If you are ever not comfortable with the way you are being talked to or the situation you are in with a mentor you should remove yourself immediately and report what occurred to a trusted adult (Jo, other Ocean Discovery staff member, etc.)
 - While you can have a private conversation with a mentor you should not be alone with a mentor. Public spaces are best.
 - You may wish to reach out to a mentor after this program is over.
 - Only reach out through email and you must cc another Ocean Discovery Staff member on the email (Jo, Isabel, Carolina, etc.).
 - You may not reach out to mentors on social media.
- Equity and inclusion (**SLIDE**):
 - Be aware of assumptions you might make based on differences.
 - Mentors and mentees come in all shapes, sizes, colors, ethnicities, races, etc.
 - Seek out opportunities to interact with others from different backgrounds – that is how you learn new things.
 - Treat everyone—regardless of race, gender, sexual orientation or status—with respect, consideration, and politeness.
- Mentors:
 - Each group of mentors will be here for a total of four days and will then head home.
 - Don't hesitate to get to know these amazing people while they are here.
 - Mentors, please feel free to interject at any point to share examples or experiences from your own life that apply to anything we are doing.

Getting to Know Each Other

- We are going to take a little time now to get to know each other and our mentors.
- Would You Rather (**SLIDE**).
 - Directions:
 - Each group will get a list of would you rather questions.
 - One person picks a question & reads it to the group.
 - Everyone in your group answers.
 - Feel free to discuss/debate your responses.
 - Pass the list to someone else who will choose a question and read it to the group.
 - Continue asking questions and discussing your answers until your time is up.
 - Example:
 - Would you rather watch TV /or/ go to the movies?
 - If you would rather watch TV raise your hand.
 - If you would rather go the movies raise your hand.
 - Ask a couple of adults and students to share their thoughts.
 - Why do you prefer TV to the movies?
 - What do you like about going to the movies? etc.
 - Activity:
 - Give each group a “Would You Rather- Questions List.”
 - Let each group ask questions until time is up.
 - Closing:
 - Thank everyone for sharing their thoughts.
 - Remind students and mentors that they have the next four days to get to know each other and to take as much advantage of that as possible.

Science Discovery Process In-Depth

Goals

- Reminder that one of the goals of this program is that everyone can name and describe all parts of the Science Discovery Process. (**SLIDE**)
 - Each day during Know it! Own it! you will learn about a new part of the Science Discovery Process in detail. (**SLIDE**)
 - You will then apply this new knowledge during a lab where you will design your own experiment.
 - Then you will have time to use new tools to remember this new knowledge.
- Because learning the science discovery process is such a big part of what we want you to walk away from this program with – you will be tested on your knowledge of the Science Discovery Process through a mid-term and a final exam.
 - Remember part of everyday will be spent using the Science Discovery Process, applying it, and learning study skills to help you remember the different parts - so you will have lots of practice!

- When we do Science Discovery Process In-Depth we will be organizing our thoughts using a concept map (**SLIDE**).
 - You will use this concept map every day in class.
 - This concept map is a tool that can be used to help you prepare for your mid-term and final exam.
 - Do the best you can to write so that you can read what you wrote later on.

- Prep SDP Concept Map.
 - Hand an concept map to each student.
 - Have each student write their name in the bottom left corner.
 - Explain that we will fill this out a little bit each day.

- Preview Knowledge.
 - Think-Share: Ask students: What do you know about the Science Discovery Process?

Science Discovery Process Overview:

- As science leaders, we will be using the Science Discovery Process (**SLIDE**).
 - The Science Discovery Process is at the heart of science, it is how science is done.
 - You will notice it's a cycle with no real beginning or end because the process is continuous.
 - At the center of science is Make a Difference.
 - Make a Difference is at the center because science leaders want to make a difference in the world, so often their observations and questions come from this.

- Review the Science Discovery Process using an example and the poster.
 - Review an example (**SLIDE**)
 - **Make a Difference:**
 - A science leader wants to improve human lives – Dr. Jean-Jacques Muyembe.
 - **Explore & Wonder:**
 - Observes: Ebola a rare and deadly disease is a virus which spreads by person-to-person contact. The majority of outbreaks occur in Africa. When outbreaks occur, there is a high death rate. Some people survive the disease and recover.
 - Question: Can the anti-bodies (disease fighting cells that your body creates) that survivors form be used to help people who get Ebola?
 - **Investigate:**
 - Hypothesis: If we inject sick people with the antibodies of Ebola survivors, then they will survive.
 - Design Investigation:
 - Create a drug which includes antibodies from Ebola survivors.

- Provide this drug to people who are diagnosed with Ebola.
- **Analyze:**
 - People who were not give the drug die at a rate of 50%.
 - People given the drug reduced the death to 30%.
 - People given the drug early reduced the death rate to 11%.
- **Communicate:**
 - Dr. Muyembe has shared the results of his study across the world, through papers, presentations, conferences, etc.
 - The importance of communicating this information to the general population in Africa is incredibly important because the sooner a person comes in for treatment the more likely they are to survive and less likely they are to spread it to friends and family members.
- **Make a Difference:**
 - Fewer people will die from Ebola!

Make a Difference

- Let's focus on the center of the Science Discovery Process: Make a Difference (**SLIDE**).
 - Have all students write "Make a Difference" in the center bubble.
- Making a difference makes the world a better place.
- There are many ways science leaders can make a difference.
 - Build knowledge about our world. (**SLIDE**)
 - Science leaders learn how spider silk (one of the world's strongest biological materials) is made by studying spiders and spider webs. They can use this knowledge to replicate the process and create textiles for human clothing that are more efficient than synthetic fibers and only generate water as a by-product. In contrast, synthetic fiber production requires petroleum to create and creates petroleum by-products that contribute to climate change.
 - (Have students write "Build knowledge about our world." in the Make a Difference bubble.)
 - Develop innovative technology. (**SLIDE**)
 - Example: Creating a way to recapture water vapor from the cooling towers of manufacturing and power plants. These industrial plants use 40% of all water in the United States for cooling processes, and much of that water is lost to water vapor. Science leaders have saved those companies millions of dollars and freed up hundreds of millions of gallons of water for other uses by creating a way to capture much of that water vapor.
 - (Have students write "Develop innovative technology." in the Make a Difference bubble.)
 - Solve problems facing our planet. (**SLIDE**)
 - Example: Developing a car that can turn food waste into energy. There is a significant trash issue in our world. Humans are creating more trash than we have places to put it. Additionally, cars using gasoline create carbon dioxide,

which contributes to climate change. By creating a vehicle that can turn food waste into energy, two problems are being solved – we are getting rid of the trash that would sit in a landfill, and we are lowering carbon dioxide emissions by creating a car that doesn't need gasoline to run.

- (Have students write “Solve problems facing our planet.” in the Make a Difference bubble.)
- Improve human lives. **(SLIDE)**
 - Example: Develop a 3D printer that can make prosthetic devices much more cheaply and quickly. This will make prosthetics available to more people who need them and improve their quality of life.
 - (Have students write “Improve human lives.” in the Make a Difference bubble.)
- Every day we will want to be thinking about how the research we participate in is making a difference in the world.

Explore and Wonder

- The rest of today and tomorrow when we go out in the field, we will focus on Explore and Wonder. **(SLIDE)**
 - Exploring and wondering about our world is what science leaders do.
 - (Have students write “Explore and Wonder” in that bubble.)
- How do science leaders explore and wonder?
 - One way is by “Making Observations” **(SLIDE)**
 - Define observation: using the senses to gather information from the natural world.
 - Examples:
 - You can use your sense of touch and observe that a shell has ridges that are too small to see with your eyes.
 - You can use your sense of smell to observe that certain plants give off a very stinky smell and some give off a very pleasant smell.
 - You can use your sense of hearing to observe that humming birds create a loud thrumming sound with their wings when they fly.
 - Science leaders make observations about the world around them all the time.
 - Ask students to make an observation about the space around them.
 - Challenge students to make observations not related to sight.
 - (Have students write “Making Observations” in the Explore and Wonder bubble.)
 - Another way science leaders Explore and Wonder is by “Asking Questions” **(SLIDE)**
 - Define question: something that may help us to answer or figure out the reason for some observation.
 - Questions often come from something we are curious about. Curiosity is simply the desire to know or learn about something.
 - Examples:

- Observation: You can use your sense of smell to observe that certain plants give off a very stinky smell and some give off a very pleasant smell.
- Questions:
 - Why do some plants give off a bad smell and some a good smell?
 - Does the smell help them to attract certain animals?
 - Why would they want to attract animals?
 - Does the bad smell keep some animals away?
- Science leaders are asking questions about things they see all the time. Often their observations lead to many different questions.
- Making observations and asking questions is an important part of the Science Discovery Process because it is these observations and questions that sometimes lead to an investigation.
- Review examples of observations and questions. (SLIDE)
 - Example #1:
 - Observation: Some of the plants in my mom's garden are short and some are tall.
 - Question: I wonder if fertilizer can affect how tall the plants will grow?
 - Example #2:
 - Observation: Sometimes water shot out of a water gun goes further than other times. People shoot water out of their water guns at different angles.
 - Question: I wonder if the angle of the water gun effects how far the water will go?
- Hand out Observation and Question vocabulary stickers.
 - Have students add these to their SDP Concept Map next to "Explore and Wonder" bubble.

Application of Science Discovery Process (SLIDES)

- Think-Pair-Shares (w/ small mentor groups)
 - Show slides. For each slide ask students to:
 - Make an observation.
 - Come up with a question.

Paper Airplane Lab

Share Goal (SLIDE)

- During the Paper Airplane Lab, you will participate in the entire Science Discovery Process yourself.
- You will have a chance to apply what you learned in the Science Discovery Process lecture to your own experiment.

Paper Airplane Overview

- Over the next two weeks, everyone will answer a question and test a hypothesis by designing an investigation, collecting, and analyzing evidence, coming to a conclusion, and sharing what they learned.
- We will do this using paper airplanes.
- Although we are limiting your experiment to paper airplanes to use minimal supplies, you will be able to test the hypothesis of your choice.

Focus: Explore and Wonder (SLIDE)

- During today's lab we will focus on Asking Questions and Making Observations.
- You will get to design a paper airplane today and then test it in our test zone, you will have time to adjust and test your design once or twice.
- Your goal today is simply to observe and ask questions about your paper airplane designs.
- We will prep our science notebooks to write down our observations/questions. (SLIDE)
 - Have students turn to the middle of their science notebook and create a triangle fold so they can easily find this section in their notebook.
 - On the triangle fold write: "Paper Airplane Lab"
 - On the first page write at the top: Explore and Wonder.
 - Underneath create a T-chart:
 - One side title: Observations
 - One side title: Questions

Design a Paper Airplane: (SLIDE)

- Everyone will get a single piece of paper to design a paper airplane.
- There is no "right" or "wrong" design because there is no "right" or "wrong" investigation to design.
- Remember today is just about making an airplane and testing it, then changing something and testing again – all the while making observations and asking questions about your design.
- Do an example:
 - Okay here is my paper airplane.*
 - *Don't make a "great looking" example because you want to avoid the students getting bogged down in trying to create something that looks "great".
 - Imagine I am outside and I am going to throw my paper airplane.
 - When I throw the airplane, I want everyone to come up with observations or questions they have.
 - (Demonstrate throwing the plane.)
 - Ask students to share any observations or questions.
 - (Write these on the board using the t-chart format.)
 - Based on the observations and questions explain what you might change in your design.
 - Well my plane didn't fly very far but it did do two loops in the air.
 - I wonder if I made the wings shorter, if it would loop even more times.
 - I am going to create a similar plane with even shorter wings.
- You will have five minutes to work on your first design.
- Do not throw your airplane in the classroom.

- (Give each student a piece of paper to create an airplane.)

Testing zone

- Review expectations (**SLIDE**)
 - Be your best-self.
 - Be curious, respectful, and safe.
- Walk students outside w/ notebooks and paper airplanes.
- Have all student's line-up on one side of the test zone (shoulder to shoulder w/ space between).
- Explain:
 - After they throw their airplane, they should leave it where it is.
 - No one should step into the "Testing Zone" until the Team Lead gives the all clear.
 - It's okay if your plane doesn't fly as far as you want, etc.
- Let students know when they are ready, they can throw their paper airplane.
- Once all paper airplanes have been thrown – give the "all clear" and let students get their paper airplane and line up to test it again.
- Repeat this 2-3 times.

Observations/Questions

- Once all paper airplanes have been thrown 2-3 times, have all students leave airplanes on the ground and record their observations and questions in their notebook.
- Give the "all clear" to pick up paper airplanes and return to the classroom.

Redesign

- Explain that students will have 5 minutes to modify their design using the same piece of paper or another.
- (Hand out additional paper to students who want it.)

Testing Zone

- Take students outside and repeat the testing zone steps above.

Observations/Questions

- Repeat Observation/Questions steps above.

Debrief

- Ask a few students to share an observation or question they made during the testing zone time.
- Over the next two weeks, you will design an investigation based on these observations and questions.

Preview Research

Introduce Preview Research

- Our last item each day is to preview and prepare for the research project we will be doing the next day.
- Through our field research we will accomplish one of our program objectives:
 - o You will experience all aspects of the Science Discovery Process firsthand. (SLIDE)
- Each day you will participate in field research with a focus on the part of the Science Discovery Process you learned the previous day.
 - o Tomorrow you will be concentrating on the Explore and Wonder portion of the Science Discovery Process.

Prior Knowledge

- Access students existing knowledge about Explore and Wonder.
 - o Think-Pair-Share (SLIDE)
 - What do you know about exploring and wondering?
- Review Explore and Wonder (SLIDE)
 - o Define observation: using the senses to gather information from the natural world. (SLIDE)
 - o Define question: something that may help us to answer or figure out the reason for some observation. (SLIDE)
 - o Ask students to give you some examples of observations and questions.

Explore Day Intro

- Introduce Explore the Bay Day.
 - o While we won't be participating in an actual research project tomorrow, we will be getting orientated to The Bay, the body of water directly off shore, where many of your research projects will take place.
 - o Orient students to their location in Baja using the satellite maps. (SLIDE)
 - o Using the gray map point out (SLIDE):
 - Where we will depart from
 - Islands we will tour
 - Where we will stop for a snorkel
 - Where we will hike
 - Where we will look for wildlife
 - Where some research projects will take place (Punta Arena, Coronado, etc.)
 - o Even though we will have a dedicated time for wildlife watching, always have your eyes open for wildlife!
- Explore and Wonder
 - o Your goal is to explore the Bay and write down a minimum of five observations and five questions before we return to the field station.

Notebook Prep

- Prep Science Notebooks:
 - o (See Science Notebook set up below.)

Review Field Ready

- Review what students will need to bring/wear to be ready for the field tomorrow.

Clean-up

- Manila Folder: **(SLIDE)**
 - Everyone will have a folder to keep all their loose papers and materials.
 - When you get your folder write your name on the tab in large letters.
 - (Give every student a manila folder.)
- Dismissal:
 - Three things to do before you can be dismissed:
 - All papers including your SDP Concept Map (fold in half) must go in your folder and in the file box.
 - (Point out where the file box is kept.)
 - Table clear - materials in basket and garbage on or below your table thrown away.
 - Chair pushed in and you are standing behind it.
- Allow students to go about the clean-up.
 - As a student is standing behind their chair – if all tasks are complete, they can be dismissed.
- **Remind mentors to hang back after Know it! Own it!**
 - Review mentor roles for Know it! Own it! portion of the day.
 - (See Know it! Own it! Overview in curriculum for ideas.)

Science Notebook

Explore the Bay	
Explore & Wonder	
Observations	Questions

Day 2: Explore the Bay Implementation Agenda

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Field Research	Team Leads
12:25 pm	Return to Field Station - Check student medication back into first aid station	Team Leads
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence -or- Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Siesta	PM Lead 1
2:30 pm	Salud	PM Lead 2
4:00 pm	Know it! Own it!	Field Research Manager & Team Lead 2
6:30 pm	Dinner	Program Manager
7:05 pm	Servant Leadership	PM Lead 1
7:35 pm	Exercise	PM Lead 2
8:30 pm	Sleep Prep	PM Lead 1
9:00 pm	Bedtime	PM Lead 2

Community Building

Day 2

Timing:

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- iPod w/ preloaded music
- Speaker

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).
- Prep supplies for Community Building Activity.

Food & Conversation

Question: In what ways is life in Bahia different from at home?

Introduction:

Review the Purpose of Food and Conversation

- Build your community of support.
 - Building a community of support is a tool for **Full hearts! Powerful minds!**
 - A community of support is a group of people who will help you on your journey to being a science leader.
 - The more people you have to support you when you face a challenge, the easier your journey will be.
 - Potential new members of your support network are all around you right now you (mentors, staff, new friends, etc.) just need to get to know them.

Review Community Question:

- (Read today's question out loud.)
- Take some time to ask the people around you this question and spark some conversation!

Community Building Activity: Networking – Handshaking & Personal Introductions

Overview: Students review handshakes and giving a personal introduction in preparation for meeting boat guides.

Introduction:

- Networking is another tool for **Full hearts! Powerful minds!**
 - Define networking: interacting with other people to share information and develop professional and social contacts.

- Some of you may remember practicing our handshakes and introductions during the Bridge program last year.
 - Just like with the Bridge program you will meet a lot of people during your time in Baja.
 - All of these people are potential professional contacts for your future.
 - Think of networking as another way to build your community of support.
- Handshakes & Introductions
 - Networking starts with introductions – people can't get to know you if you don't introduce yourself.
 - Whenever we meet someone new during this program we will all introduce ourselves by shaking hands and sharing our name.
 - When shaking hands and introducing yourself, be sure to:
 - Make eye contact.
 - Smile.
 - Shake hands with a firm grip.
 - Use a strong voice.
 - Ex: My name is _____. I'm an Ocean Leader. It's nice to meet you.
 - (Demonstrate a strong introduction.)

Activity:

- When the music plays walk around and mingle.
- When the music stops, partner with the person closest to you.
 - Make eye contact, smile, shake hands, and introduce yourself.
- When the music starts again, thank your partner, and begin mingling again.
- The next time the music stops you must find a NEW partner and introduce yourself.
- We will repeat this pattern a few times.

Debrief:

- Potential Questions:
 - How did you feel when you were introducing yourself? Did anyone else feel that way? A different way?
 - What was the most difficult part for you: speaking with a strong voice, making eye contact, shaking hands, or smiling?
- Be proactive!
 - It's important that you approach the world rather than waiting for it to come to you.
 - While meeting new people can feel intimidating, it's an important part of being a science leader. You will meet many new people throughout the program- remember- be proactive! Try and approach them first rather than waiting from them to come to you.
 - Remember it's okay to "Fake it till you are it!". Confidence can be built over time.
- Practice.
 - Later today we will go to the boat ramp to meet our boat guides. Be sure to introduce yourself to your guide with a handshake and your name.
 - Tomorrow during breakfast try to introduce yourself to one adult you don't know.

Morning Announcements:

- Review daily schedule and any boat/snorkel groupings.
- Review gear for the day:

- Wear: a swimsuit, water shoes or closed-toed shoes, hat, sunglasses, short/long sleeves.
- Backpack: Science notebook and pencil, towel (optional)
- Fill and bring a water bottle.
- Snorkel gear & wetsuit
- Close-toed shoes for hike
- Apply sunscreen.
- Review musical cue
 - You need to be in the classroom by the end of “xx” song, when it begins, you have ~2 minutes to get to the classroom.
 - Today if you are late, you will be marked tardy.
- Ask Facilities Manager if they have any updates to share.

Field Research
Explore the Bay

Overview

Location:

- The Bay
 - o Path: West side of Ventana through Cerraja and Llave, between Pata and Bota and then to Coronadito, after snorkel and wildlife watching boats return to boat ramp.*
 - *We will be omitting Calavera from this day because it will now be part of Islas Research Project.

Supplies:

- All Supplies on **General Field Research Supplies Check List**
- Map of the Islands of Bahía de los Ángeles (laminated) (1/boat)
- Large dry bag (2/boat)
 - o For student hiking shoes*

Timing:

Time	Activity/Location	Breakdown
7:15 – 8:00AM	Prep & Transportation: Field Station	7:15 – 7:25AM: Students Prep for Field 7:25 – 7:35AM: Gear Check* 7:35 – 7:50AM: Drive to Boat Ramp 7:50 – 8:00AM: Park, Unload & Final Gear Check
8:00 – 12:00PM	Field Research: Field	8:00 – 8:15AM: Introductions 8:15 – 9:00AM: Drive to Coronadito 9:00 – 10:55AM: Coronadito <ul style="list-style-type: none"> • 9:00 – 9:55AM Rotation 1 <ul style="list-style-type: none"> o Team Lead 1: Hike Coronadito o Team Lead 2: Snorkel Coronadito • 9:55 – 10:05AM Switch • 10:05 – 10:55AM Rotation 2 <ul style="list-style-type: none"> o Team Lead 1: Snorkel Coronadito o Team Lead 2: Hike Coronadito 11:00 – 11:45AM: Wildlife Watching and Ventana 11:45 – 12:00PM: Return to dock & Thank You’s
12:00 – 12:25PM	Return to Field Station	12:00– 12:15PM: Load Vans & Return to Field Station 12:15 – 12:25PM: Unload & Rinse Gear

Overview of Explore the Bay (Instructors Only):

This is not a research project but rather an opportunity for students to have a “Wow!” moment while exploring the bay, seeing the islands, hiking, snorkeling, and looking for wildlife. **The goal is for students to record several observations and questions in their science notebooks.**

Many of the alumni and science mentors have spent time doing research on islands in the bay, ask them to share their experiences with the students throughout the day.

Field Research

Introductions

- Have each person take a turn and introduce themselves and say their name and their favorite animal in Spanish and English (Ocean Discovery staff and students).

Calavera & Sea Lions

- Depart for Calvera.
 - o Take out map of the islands and point out different islands as you go.
 - Island names and translations:
 - Ventana = window Llave = wrench Cerraja = locksmith
 - Pata = paw Bota = boot San aremar = xx;
 - Flecha = arrow Jorabado = hunchback Coronado = crown
 - Ballena Channel = whale channel Ventana = window
 - Coronado = Osprey Nest
 - Mate for life; Add to their nest each year; Can weigh up to 1,000 lbs
- Point out Calavera.
 - o Translation = skull
 - o Guano (bird poop)
 - Point out birds on the island; guano gives the island it's white color;
 - Is high in nutrients which can provide nutrients for other organisms that live on the island.
- Observe sealions.
 - o Males are larger (up to 800 lbs. and 7 feet long)
 - o Females are smaller (up to 250 lbs. and 6 feet long)
- **Give students 5 minutes to record observations and questions in science notebook before departing.**

Coronadito

Hike Coronadito

- o Boats will off load on a rocky shoreline – make sure staff and students are prepared to off-load before drivers head over.
- o Team Lead:
 - Have students put tennis shoes in dry bags.
 - Bring first aid kit, marine radio, student meds, and snacks.
 - Assign student to carry above bags.
 - Hold boats at shore and help students get off the boats.
- o Students:
 - Bring water bottles, hat, sunglasses, science notebook, pencil, and backpack.
- o Once on land:
 - Have students put on tennis shoes.



- Review safety:
 - Watch for cactus; rocks may be loose; don't put hands or feet in hidden areas.
 - Always do 3 points of contact when on hike to top of island.
- Hike to top of Coronadito.
 - Have an adult at front and back of line.
 - Point out:
 - Geology – pumice, ingenious rocks
 - Blue-footed boobies
 - Look for turtles
 - Point out La Guardia – what makes this island different? Fisherman camps, lots of invasives, 2nd largest island in Sea of Cortez
 - Coronado clouds: as it gets windy the air expands which causes moisture and forms the ring at the top.
 - Take a photo at the top.
 - Snacks and water.
 - **Give students 5 minutes to record observations and questions in science notebook before departing.**
 - Hike down to meet boat for pick-up.

Snorkel Coronadito Bay

- Change into snorkel gear.
- Students snorkel around the protected bay.
 - All student start w/ life jackets but after 15 minutes if they feel comfortable may take them off.
 - Students may NOT snorkel outside the protected bay.

Wildlife Watching and Ventana

- Boat guides can drive around the area to look for whales, whale sharks, etc.
 - Ballena Channel = Whale Channel
 - Deep water – allows space for migrating whales.
- Stop at Ventana.
 - Take a group picture with Ventana in the background.
- If time and sea state allows: give students 5 minutes to record observations and questions in science notebook before departing.

Return to Dock & Thank You's

- Before students are dropped off at the dock be sure they thank their boat captain.

Self-Reflection Day 2

Supplies:

- Rules for Writing (1/student)
- Clipboard (1/student)

Review Purpose of Self-Reflection

- See “Day 1: Self- Reflection” curriculum.

Review Rules for Writing

- Have students take turns reading the rules out loud.
 - *This helps to settle and center them in their space.*

Engagement: Word Pool

- Describe a word pool.
 - A way to get our creativity going.
 - Just like a word bank.
 - It’s an opportunity to remind yourself of experiences you’ve had today.
 - A place you can look to for inspiration while you are writing.
 - A word you say might trigger a memory for someone else and vice versa.
- Create a word pool.
 - Each person will say one word about something they experienced today.
 - For example, cactus, water, joy, tacos, boating, running, etc.
 - If someone has already said your word, try to choose another.
 - We will all write the words down in our notebook.
 - Have students open to a blank page.
 - Go around until every student has contributed a single word.
- Add the five senses to the word pool: hear, see, taste, touch, and smell.

Writing Prompt

- Prompt: **Today, when I woke up I heard....**
 - You will have 10 minutes to write.
 - Try to use as many of the words from the Word Pool as you can, don’t forget to include the five senses.
 - In order to keep your pen to the page, start each new sentence with “And, then...”
 - For example, Today I woke up and heard the sea gulls squawking. And then I opened my eyes and saw the orange sun rising. And then, I smelled breakfast, and then...
- Write: Give students 10 minutes to write with a 2-minute warning.

Pair-Share

- (If time allows) Pair students up so they can read their writing to each other.
- Ask students to share their writing with the group.

Know it! Own it!

Day 2

Logistics

Supplies

- Laminated Index Cards with #1-25
- Chart paper (8 sheets)
- Sharpies (8)
- Chart paper (6)
- Sharpies-thick (6)
- Vocabulary stickers (1 of each/student)
 - Global warming
 - Sea-level rise
 - Intertidal zone
 - Hypothesis
- Sea-Level Hypothesis Stickers (1/student)

Set Up

- Create a large version of each of the “Application of Science Discovery Process” examples in the curriculum below.
 - Write one example per piece of chart paper (1 example/3-4 students)
 - Depending on the number of students you may need to make two copies of some of the “Application of Science Discovery Process” examples.
 - Hang chart paper around the room.
 - Spread chart paper out so students have space to work.
 - Each piece of chart paper should have an accompanying sharpie marker.
- Create another set of chart papers (1 piece/3-4 students)
 - Write “Global Warming” in large letters at the top of each.
 - Place these off to the side to be hung up while students are working on paper airplane lab.

Timing

Time	Activity/Location	Breakdown
25 minutes	Analyze & Make a Difference	4:00 – 4:05 Know it! Own it! Overview 4:05 – 4:25 Analyze & Make a Difference
35 minutes	Science Discovery Process In-Depth	4:25 – 4:30 Preview Knowledge 4:30 – 4:40 Investigate: Hypothesis 4:40 – 5:00 Application of Science Discovery Process
30 minutes	Paper Airplane Lab	5:00 – 5:10 Paper Airplane Hypothesis 5:10 – 5:25 Students Write Hypothesis 5:25 – 5:30 Students Choose a Hypothesis

30 minutes	Study Skills	5:30 – 5:35 Intro to Flash Cards 5:35 – 5:45 Example Flash Card 5:45 – 5:55 Create Flash Cards
25 minutes	Preview Research	5:55 – 6:05: Prior Knowledge 6:05 – 6:15: Global Warming Intro 6:15 – 6:20: Notebook Prep 6:25 – 6:25: Clean-up

Lesson**Analyze & Make a Difference**Know it! Own it! Overview:

- Welcome students to Know it! Own it! (**SLIDE**)
 - If you recall – Know it! Own it! is our Mantra for Growth Mindset tools related to Learning.

- Growth Mindset.
 - Think-Pair-Share: (**SLIDE**)
 - Let's take a moment to think about our mindset as it relates to our ability to learn new things in science.
 - Where do you feel you are on the Growth Mindset continuum as it relates to learning science?
 - Has this changed at all since yesterday? If yes, in which direction? Why do you think that happened?
 - Wherever you are on the growth mindset continuum is okay.
 - If you are on a more fixed mindset side, try to identify any challenges that come up for you today while talking about science.

- Review Know it! Own it! Format. (**SLIDE**)
 - This is a time for us to take new knowledge and Know it! (point to head) and Own it! (make a fist).
 - As a reminder each day of Know it! Own it! will be broken up into five parts:
 - Analyze & Make a Difference: We will analyze the data we collected during our morning research and consider how that research is being used to make a difference in the world.
 - Science Discovery Process In-Depth: We will learn about a new part of the Science Discovery Process in-depth.
 - Paper Airplane Lab: We will apply our knew SDP knowledge to design and conduct our own experiment using paper airplanes.
 - Study Skills: We will learn and practice some tools for remembering and recalling new knowledge.
 - Research Preview: We will learn about the research project we will be participating in the following day and prep our science notebook for the field.

Analyze and Make a Difference

- Review Explore & Wonder:
 - Our focus for this morning's field research was on Asking Questions and Making Observations.
 - Ask students which part of the Science Discovery Process this is part of?

- Explore and Wonder. **(SLIDE)**
 - Ask students to define observation.
 - Using the senses to gather information from the natural world. **(SLIDE)**
 - Ask students to define question.
 - Something that may help us to answer or figure out the reason for some observation. **(SLIDE)**
- Observations & Questions: **(SLIDE)**
 - (Have students open their notebook to where they were writing their observations and questions.)
 - Let's take a moment to refresh our memory about what we observed or had questions about.
 - Give students 2-3 minutes to add an additional observations or questions they had from the morning.
- Observations & Questions Group-Share **(SLIDE)**
 - Have students share observations they made with their small group.
 - Then have students share out their observations with the whole group.
 - Practice presentation skill: Speaking slowly and clearly.
 - What you have to say is important so take the time to speak slowly and clearly.
 - Write their observations on the whiteboard.
 - Ask if other students made similar observations.
 - Repeat the above for questions.
- Make a Difference. **(SLIDE)**
 - Have students look at all the questions and observations.
 - As a group of science leaders, we had many different observations and questions even though we all visited the same places.
 - That is because we all see the world differently because we are all unique individuals who come from different backgrounds, races, ethnicities, religions, genders, etc. and we have all had different life experiences.
 - This is called a diversity of thought.
 - Diversity of thought leads to:
 - Developing innovative technology.
 - Building knowledge about our world.
 - Solving problems facing our planet.
 - Improving human lives.
 - If every science leader came from the same background we wouldn't have much diversity of thought.
 - Diversity of people and thought is essential to science.

- The more diverse our community of science leaders the more different ideas we have and the more ways we will make a difference!

Science Discovery Process In-Depth

Preview Knowledge

- Review objective: (**SLIDE**)
 - Everyone can name and describe all parts of the Science Discovery Process.
- Connect Explore and Wonder to investigate (**SLIDE**)
 - Ask students what they already know about the Science Discovery Process.
- When we do Science Discovery Process In-Depth we will be taking notes using an outline of the Science Discovery Process.
 - (Have students take out SDP Concept Map from their folder.)
 - Yesterday and this morning we spent time with the “Explore & Wonder” bubble – making observations and asking questions.
 - Often when science leaders make observations and come up with questions this will lead them to the next part of the Science Discovery Process – “Investigate”.
 - Therefore, Explore and Wonder is connected to Investigate.
 - Have students:
 - Write “Investigate” in correct bubble.
 - Add an arrow connecting Explore and Wonder bubble to Investigate bubble.
- Preview Knowledge. (**SLIDE**)
 - We are going to spend the next few days looking in-depth at the “Investigate” bubble.
 - Think-Share: What does the word “Investigate” make you think of?

Investigate: Hypothesis

- Investigate (**SLIDE**)
 - Over the next few days, we will look at all of the components of the “Investigate” bubble:
 - Make Hypotheses
 - Design Investigation
 - Gather Evidence
 - Today we will focus on “Make Hypothesis”.
 - Have students write “Make Hypothesis” in Investigate bubble.
 - Preview Knowledge: What do you think Make Hypothesis means?
- Hypothesis. (**SLIDE**)
 - Define Hypothesis: an educated guess based on information you already know.

- When science leaders have a question they want to investigate, they will start by forming a hypothesis based on information they already know or research from other science leaders.
- If...Then...: **(SLIDE)**
 - Most but not all hypotheses are written as if... then... statements that show a cause-and-effect relationship.
 - The if... part is about what you are changing and the then... is about what you observe.
- Example: **(SLIDE)**
 - If I add fertilizer to my apple tree, then the apples on my apple tree will grow taller.
 - The if... part is about what you are changing (the amount of fertilizer) and the then... is about what you observe (the change in tree height).
- Think-Pair-Share Example #1 **(SLIDE)**
 - Observation: My aunt has plants and most of them are short. My grandpa also has plants but many of his are tall. It rains more where my grandpa lives.
 - Question: I wonder if the amount of water a plant gets can affect how tall it will grow?
 - Hypothesis: ?
- Think-Pair-Share Example #2 **(SLIDE)**
 - Observation: I set the oven to different temperatures when I cook chicken. It takes different amounts of time to cook the chicken.
 - Question: I wonder if I set the temperature higher if my chicken will cook faster?
 - Hypothesis: ?
- Hand out Hypothesis vocabulary stickers.
 - Have students add these to their SDP Concept Map next to “Investigate Bubble”.

Application of Science Discovery Process:

- Overview
 - In a moment you will have an opportunity to apply this new knowledge.
 - Applying knowledge is part of Know it! (point to head) and Own it! (make a fist).
 - Applying knowledge means taking knowledge and applying it to a new circumstance.
 - You now know the definition of a hypothesis, the format many hypotheses are written in, and seen some examples of hypotheses.
 - Now you will try to apply this knowledge to write your own hypothesis.
 - Each person will each be assigned to a poster. **(SLIDE)**
 - On the poster are some observations and questions.
 - Work with your group to write a hypothesis based on the information you are given.

- Elect one person from the group to present your work to the class.
 - The presenter will share the observations, questions, and hypothesis.
 - When presenting today we will focus on using a “strong voice”.
 - Using a strong voice means speaking loudly enough for everyone to hear.
 - The things you have to say are important- let people hear them!
 - Everyone will be a presenter at some point, if not today, then tomorrow.
 - If time allows, have your presenter practice their presentation.
- Application Activity
 - Example #1:
 - Observations: Some of the plants in my mom’s garden are short and some are tall. My mom puts fertilizer on some of her plants but I’m not sure which ones.
 - Question: I wonder if fertilizer can affect how tall it will grow?
 - Hypothesis:
 - Example #2:
 - Observations: Sometimes I study for tests and sometimes I don’t. My grades are different in every subject.
 - Question: Does studying effect my grades?
 - Hypothesis:
 - Example #3:
 - Observations: Sometimes water shot out of a water gun goes further than other times. People shoot water out of their water guns at different angles.
 - Question: I wonder if the angle of the water gun effects how far the water will go?
 - Hypothesis:
 - Example #4:
 - Observations: I fed my new fish Food A the first month I had them, then I fed them Food B the second month I had them. I think they are getting bigger faster now.
 - Question: Does Food A or Food B help fish grow faster?
 - Hypothesis:
- Debrief
 - Have each group present.
 - Focus on having the presenter use a strong voice – have them start over if necessary but use the group to encourage them – snapping, clapping, cheering, etc.

Paper Airplane Lab

Paper Airplane Hypothesis:

- Paper Airplane Hypothesis:
 - We will continue applying our knowledge about hypothesis by creating a hypothesis of our own about paper airplanes.
 - You will return to the observations and questions you wrote down during Paper Airplane Lab yesterday.
 - Your goal will be to take one of your questions and write a hypothesis for it.
 - Remember the goal isn't to write a hypothesis you know is correct. The goal of writing a hypothesis is to answer a question you have.
- Example Hypothesis: **(SLIDE)**
 - Pair-Share: Are these strong hypotheses? Why or why not?
 - Longer paper airplanes fly further.
 - Not strong: Not in If..., then... format:
 - If I make the wings on my paper airplane wider, then my plane will fly further.
 - Yes. If..., then... format. Testing only one thing – width of wings.
 - If I make the wings on my paper airplane wider and longer my paper airplane will fly further.
 - No. It is in if..., then... format but it is testing two things – width and length of wings.
 - If I cut my paper airplane wings into a curve, then my plane will be able to fly in a circle.
 - Yes. If..., then... format. Testing one thing – curve of wings.
- Write a Hypotheses: **(SLIDE)**
 - Use the If..., then.... format.
 - Make sure your hypothesis is only testing one thing.
 - Finished early? Write another hypothesis from a different observation or question.
 - Have students locate the “Paper Airplane Lab” triangle fold in their science notebook. **(SLIDE)**
 - Turn to the next blank page and at the top write “Investigate”
 - Underneath “Investigate” write: “Hypotheses”.
 - Students can write their hypothesis here.

Students Write Hypothesis

- Give students time to write hypothesis.

Choose a Hypothesis to Test

- Group Hypothesis:

- Within your group, you will look at all the hypothesis you have all written and choose one to investigate for the rest of the program. **(SLIDE)**
 - Be sure to choose a hypothesis that interests the whole group- this what your group will be investigating over the next several days.
 - Everyone in the group must write the agreed upon hypothesis down and circle it in their notebooks.
- Give students time to choose.
 - (Walk around and make sure all chosen hypotheses can be tested.)
 - (Make sure all students in the group have written and circled the one hypothesis the group will investigate.)
- If time allows, have a few groups share the hypothesis they are going to investigate.

Study Skills

Intro to Study Skills

- Throughout our lives, in high school, college, and beyond we will need to take information and make it our own.
 - Know it! (point to head) and Own it! (make a fist).
 - There are many ways to take knowledge and make it your own.
- Memorization. **(SLIDE)**
 - One of the most basic ways to make knowledge your own is to memorize it.
 - Memorizing knowledge allows us to recall it and apply it to future learning.
 - Flash cards are one way to memorize knowledge.
 - Flash cards are a growth mindset tool that supports learning. **(SLIDE)**
- How do flash cards work?
 - Science tells us flash cards are used to encourage active recall.
 - The format of a flash card, usually a question on one side of the card and the answer on the other, requires students to look at one side and recall the information from the other side.
 - Using flash cards creates stronger neural connections in the brain.
 - If you struggle with certain flash cards, you can repeat those questions more frequently than the other cards to establish a better neural connection.
 - Science has shown using flash cards to be an extremely effective way to improve memory.
- Introduce Flash Cards.
 - Some of you may recall we created and used flash cards to study during the Bridge Program.
 - Flash cards are simply cards that have related information on both sides.
 - The most basic type of flash card is a definition. **(SLIDE)**
 - Word on one side and a definition on the other.
 - Onomatopoeia: a word that resembles or imitates the word it describes.
 - Examples: Buzz, pitter-patter, sizzle.

Example Flash Card

- Pair-Share
 - Ask students where they think they could look for words that they think are important to memorize? **(SLIDE)**
 - Ask students to come up with some words and definitions they have learned in the last two days that they think would be important to memorize. **(SLIDE)**
 - Give students 2-3 minutes to look through their science notebook to come up with ideas.

- Write ideas on the board and then discuss as a group which should be turning into flash cards.
 - Observation
 - Question
 - Hypothesis
- Example Flash Card (**SLIDE**)
 - (Hand out four index cards and a binder clip to each student.)
 - As a group demonstrate how to create the first flash card step by step.
 - Have students copy each step with you.
 - It is important to write neatly so that you and other people can read your flash cards later.

Create Flash Cards

- Have students create flash cards for the remaining two words the group agreed upon. (**SLIDE**)
 - Remind students to ask for help if they need it. Asking for help is part of having a growth mindset.
 - Have mentors help by checking that each student in their group has a complete set of three flash cards.
- When students are finished have them take their last index card and write their name on it – then put all their flash cards together behind the one with their name and binder clip them together.
 - Flash cards will go in manila folders.

Research Preview

Prior Knowledge

- Access students existing knowledge about global warming.
 - Tomorrow's research project will be focused on sea-level rise, one of the effects of global warming.
 - Activity (**SLIDE**):
 - Divide students into groups of 3-4 students.
 - Assign each group to a piece of chart paper.
 - Ask each group to brainstorm what they know about global warming to write it under "Global Warming" in their t-chart.
 - Give students 3-4 minutes to work.
 - Debrief:
 - Ask each group to share out one thing they wrote about global warming.
 - Write each of these on the whiteboard.
 - Place a star next to any statements that are repeated by a group.
 - When all groups have shared ask students if they think any of the statements written are incorrect. Debate these.

Global Warming Intro

- Introduce:
 - Global warming is one of the biggest problems facing our planet today, so it is important to understand how and why it is happening.
- Global Warming:
 - (Atmosphere **SLIDE**.)
 - The Earth is surrounded by an atmosphere.
 - The atmosphere is made up of gases.
 - (Atmosphere Traps Heat **SLIDE**.)
 - Some of the gases in the atmosphere trap energy from the sun.
 - When energy from the sun hits the Earth, rather than all of that energy being reflected back into space, some of the energy is trapped by greenhouse gases in the atmosphere.
 - Carbon dioxide and methane are examples of greenhouse gases.
 - This trapped energy warms the Earth, and this is a good thing.
 - The atmosphere's ability to trap heat is one of the reasons the Earth is habitable when other planets are not.
 - If there were no atmosphere the average temperature on earth would be 0° Fahrenheit (-18° Celsius).
 - (Earth In Balance **SLIDE**.)
 - For a long time, the Earth was in balance.
 - The amount of energy being trapped and the amount of energy escaping created a nice warm place for plants and animals to thrive.

- (Earth out of Balance **SLIDE**.)
 - Humans have put things out of balance by adding more greenhouse gases like CO₂ and methane to the atmosphere which causes more heat to be trapped.
- (Humans and Climate Change **SLIDE**.)
 - Humans add CO₂ to the atmosphere through the burning of fossil fuels (oil, gas, and coal) to create energy (lights, computers, cell phones, etc.) and to power vehicles (cars, planes, buses, etc.).
 - Humans have added a lot more carbon dioxide to the atmosphere since the 1880's and unfortunately, we aren't stopping. We have only increased our use of fossil fuels each year.
- (Global Warming **SLIDE**.)
 - By adding more CO₂ to the atmosphere, more heat is being trapped, and the Earth is getting warmer – Global Warming.
 - Humans have increased the Earth's average temperature 1.8 degrees Fahrenheit since the pre-industrial period.
 - We are speeding up that increase. More recently we are increasing temperatures 0.32 degrees Fahrenheit per decade.
 - Increasing temperatures on earth have many impacts such as heat waves, more frequent droughts, and sea-level rise.
- (Sea-level Rise **SLIDE**.)
 - Tomorrow we will be focusing our research on sea-level rise.
 - Define: Sea level rise is an increase in the level of the world's oceans due to global warming.
- (Sea-level Rise How **SLIDE**.)
 - How: Thermal expansion & melting of land-based ice (glaciers, etc.).
 - Thermal Expansion: as temperatures rise, so do the temperatures of the world's oceans. Warmer water expands and takes up more space.
 - Glaciers melting: As temperatures rise glaciers melt and add water to the ocean which also contributes to sea-level rise.
- Think-Pair-Share: (**SLIDE**)
 - What could be potential impacts of sea-level rise?
- Introduce Research Question: (**SLIDE**)
 - How could sea-level rise impact animals that live along the coast of Bahia?
- Introduce intertidal zone:
 - Sea-level rise occurs very slowly, so it can be difficult to predict its impacts in the future, however, sea-level rise can be simulated by studying the intertidal zone.
 - Define intertidal zone: the land between high tide and low tide (**SLIDE**).
 - The intertidal zone has a low tide when water is gone and some parts are exposed to air and a high tide when it is submerged by seawater (**SLIDE**).

- Describe how the intertidal zone can be used to simulate sea-level rise.
 - You could think of low-tide being the current sea-level and high-tide as what the world might look like if sea-level continues to increase.

- Introduce Research:
 - We will sample the amount and types of animals that live in two places: low tide zone and high tide zone (**SLIDE**).
 - **If** the types of animals we find in both locations are the same, we might conclude that sea-level rise will not have an impact on the animals along the coast. (**SLIDE**)
 - This could mean that the amount of water is not something that determines where these animals live – they can live where there is more water (low tide) and where there is little water (high tide).
 - **If** the types of animals we find in both locations are different, we might conclude that sea-level rise will impact some of the animals along the coast. (**SLIDE**)
 - This could mean that the amount of water is something that determines where these animals live – certain animals live where there is more water (urchins, sea stars, anemones) and certain animals live where there is less water (whelk, t-rex, barnacles).

- Think-Pair-Share: (**SLIDE**)
 - Determine a Hypothesis: If we survey the types of animals in the low and the high tide zone, then the types of animals (will/will not) change.
 - Point out if... then... format of hypothesis.
 - Explain that your choice of hypothesis will be based on if you think climate change will impact the animals along the shore.
 - No = animals will not change
 - Yes = animals will change
 - Explain to students that not everyone needs to have the same hypothesis.

Notebook Prep

- Prep Science Notebooks:
 - (See Science Notebook set up below.)
- Have students circle their proposed hypothesis.
- Hand out vocabulary stickers for student to place in notebook under Vocabulary:
 - Global warming
 - Sea-level rise
 - Intertidal Zone

Science Notebook

Field Research: Sea-Level Rise		Investigate
Explore & Wonder		Hypothesis:
Observations	Questions	Accept or Reject? Why?
		Vocabulary

Clean-up

- Review clean-up procedure from yesterday.
- Dismiss students as they are done.

Day 3: Sea-Level Rise Implementation Agenda

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Field Research	Team Leads
12:25 pm	Return to Field Station - Check student medication back into first aid station	Team Leads
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence -or- Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Siesta	PM Lead 1
2:30 pm	Salud	PM Lead 2
4:00 pm	Know it! Own it!	Field Research Manager & Team Lead 1
6:30 pm	Dinner	Program Manager
7:05 pm	Servant Leadership	PM Lead 1
7:35 pm	Exercise	PM Lead 2
8:30 pm	Sleep Prep	PM Lead 1
9:00 pm	Bedtime	PM Lead 1

Community Building

Day 3

Timing:

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- iPod w/ preloaded music
- Speaker

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).
- Prep supplies for Community Building Activity.

Food & Conversation

Question: What was a great part of your day yesterday?

Review Community Question:

- (Read today's question out loud.)

Community Building Activity: Curiosity Questions – High School

Overview: This activity is meant to break the ice and let people get to know each other.

Introduction:

- Today's activity is: Curiosity Questions.
- The goal is to get to know each other better by learning about our experiences in high school.
- Expectations:
 - When music plays walk around and mingle.
 - When the music stops partner with the person closest to you.
 - A question will be read.
 - Introduce yourselves and answer the question.
 - If time remains you can discuss the question from breakfast or anything else, you would like to talk about.
 - When the music starts again, thank your partner, and begin mingling again.
 - The next time the music stops you must find a NEW partner.
 - We will repeat this several times.

Activity:

- Start music and allow people to mingle.
- After ~10-20 seconds stop the music and read a question from below.
- Allow pairs 1-2 minutes to talk, then begin the music again.

- Curiosity Questions – High School
 - What was/has been surprising about high school?
 - What was/has been challenging about high school?
 - What do you want to do differently this coming year of school or work (mentors)?
 - What is/was the thing you get/got most excited about in high school?
 - Think about a teacher’s class where you felt you really learned, what do you think made that person a good teacher for you?

Debrief:

- Potential questions:
 - What is one thing you learned about another person today?
 - What is something you learned you have in common with another person?

Morning Announcements

- Review daily schedule and any boat/snorkel groupings.
- Review gear for the day:
 - Wear: a swimsuit, water shoes or closed-toed shoes, hat, sunglasses, short/long sleeves.
 - Backpack: Science notebook and pencil, towel (optional)
 - Fill and bring a water bottle.
 - Snorkel gear & wetsuit
 - Apply sunscreen.
- Ask Facilities Manager if they have any updates to share.

Field Research
Sea-Level Rise

Overview

Research Contact: Drew Talley (University of San Diego)

Location:

- Shara’s House

Supplies:

- Field research:
 - o All Supplies on **General Field Research Supplies Check List** (see above)
 - o Sea-level Rise Datasheet copied on Write in the Rain paper (8)
 - o Sea-Level Rise Field Research Protocol for Mentors (8)
 - o Intertidal Organisms ID Card (8)
 - o Common Rocky Intertidal Invertebrates of Bahia de los Angeles Guide (1)
 - To be used as backup if organisms aren’t found on Intertidal Organisms Card
 - o Clipboard + pencil (8)
 - o 100m transect tape (4)
 - o 10-sided dice (2w)
 - o Thermometer for taking ocean temperature (2)
 - o Weather station (4)
- Field trip:
 - o Industrial blender (from Glendale Kitchen) (1)
 - o Disposable cups and straws that are environmentally friendly (30)
 - o Bags frozen mango (3)
 - o Bags frozen pineapple (3)
 - o Bags frozen spinach (3)
 - o Bananas (peeled, frozen and individually bagged separately) (5)

Timing:

Time	Activity/Location	Breakdown
7:15 – 8:00AM	Prep & Transportation: Field Station	7:15 – 7:25AM: Students Prep for Field 7:25 – 7:35AM: Gear Check 7:35 – 7:50AM: Drive to Shara’s House 7:50 – 8:00AM: Park, Unload & Final Gear Check
8:00 – 10:00AM	Field Research: Field	8:00 – 8:10AM: Set-up Beach Area 8:10 – 8:25AM: Review Data Collection Methods 8:25 – 8:25AM: Prep for Research 8:35 – 9:50AM: Collect Data 9:50 – 10:00AM: Clean-up

10:00 – 12:00PM	Field Trip: Field	10:00 – 10:45AM: <ul style="list-style-type: none"> • Group 1: Snorkel • Group 2: Smoothies @ Shara’s House 10:45 – 10:55AM: Switch 10:55– 11:40AM: <ul style="list-style-type: none"> • Group 1: Smoothies @ Shara’s House • Group 2: Snorkel 11:40 – 12:00PM: Clean-up, Goodbye’s & Depart
12:00 – 12:25PM	Return to Field Station	12:00 – 12:15PM: Drive to Field Station 12:15 – 12:25PM: Unload & Rinse Gear

Overview of Research (Instructors Only):

The goal of this research project is for students to understand that sea-level rise could have an impact on the animals that live along the coast. Students will survey and compare the types and numbers of intertidal species along two transects parallel to the shoreline. One transect will be set close to the waterline (low tide zone) and one will be set in the high tide zone. Students should notice a difference in the number and types of species that inhabit these two areas.

How sea-level rise could impact animals along the coast: as sea-level increases, organisms that live in the low tide zone may not be able to adapt to being immersed in water all the time, and organisms that live in the high tide zone may not be able to adapt to water covering their environment for longer periods of time. Losing species of animals can cause a disruption in food webs, issues for local people who forage and eat some of the intertidal species (blue crabs, urchins, sea cucumber, chiton, and whelk), and lowers diversity worldwide.

See Dr. Talley’s short paper on climate change in Instructor Resources section.

Field Research

Set-up Beach Area:

- Set-up umbrellas.
- Set down equipment in shade.
- Grab science notebooks.
- Remind students of their research group.
- Pass out materials for data collection.

Review Data Collection Methods

- Review tools & datasheet.
 - o Demonstrate how to use tools:
 - Thermometer: measuring ocean temperature
 - Weather Station: air temperature, wind speed, and direction
 - o Demonstrate Collection Methods & Filling Out Datasheet:
 - (See Data Collection below & Sea-Level Rise Datasheet.)
 - Be sure to point out appropriately sized rocks to choose – larger rocks are better but no larger than the size of a human head (approximately between 30-70cm).
 - Explain that each time a new organism is identified using the ID guide, it's name should be recorded on the data sheet under: "Name of Organism".
 - The total number of those organisms found under or on the rock should be recorded on the datasheet as a number under: # of organisms.
 - There will be several numbers recorded in the: # of organism box by the end of the transect.
 - Students can leave the "Total" column blank.
 - o Review group roles:
 - Data recorder (1):
 - Records information on data sheet from Data Collectors.
 - Roles 10-sided die and determines which rock the team will collect data from.
 - Data Collectors (2):
 - Identify an organism and count the total number under or on rock.
 - o Both Data Collectors must come up with an amount of organisms that is within two numbers of each other or a recount must be done.
 - o Example: If Data Collector 1 says: 3 brittle stars and Data Collector 2 says: 6 brittle stars – a recount must be done.
 - o Example: If Data Collector 1 says: 15 sea slugs and Collector 2 says 16 sea slugs – no recount is necessary: record the average: 15.5 sea slugs.
 - Repeat for a new organism.
 - Continue until all organisms under or on the rock have been identified and counted.

Prep for Research

- Lay out transects (one set for each Team Lead):
 - o Low Tide Zone: (2) 100 m transect tape parallel to the shoreline.
 - This will work best if transect tape is actually in the water a bit.

- High Tide Zone: (2) 100 m transect tape in the high tide zone parallel to the shoreline and above the low tide zone transect tape.
- Divide students into groups.
 - Ideal: 1 mentor/3 students + 1 Team Lead to supervise a set of transects (1 low tide and 1 high tide)
 - Give each group a clipboard, pencil, data sheet, thermometer, 10-sided die, weather station, and an Intertidal Organisms ID card.
 - Each Team Lead:
 - Send each Mentor/Student Group to start in a particular location:
 - Group 1: High Tide Zone (far left)
 - Group 2: High Tide Zone (far right)
 - Group 3: Low Tide Zone (far left)
 - Group 4: Low Tide Zone (far right)

Data Collection:

- Fill out the top of the data sheet.
- Transect 1:
 - Start at assigned end of transect:
 - Generate a random number by rolling the 10-sided die once.
 - The number generated will correspond to a meter marking in the first 10 meters of their side of the transect tape (ex. Group 1 starts in 0-10 m and Group 2 starts in 90-100 m).
 - Example: Group 1 rolls a 4. They walk to meter 4 on the transect tape.
 - Example: Group 2 rolls a 6. They walk to meter 96 on t transect tape.
 - When standing at your location on the transect tape pick the closest rock that is between 30-70cm.
 - GENTLY turn the rock over and use Intertidal Organisms ID card identify, count, and record on the data sheet all the organisms you see.
 - Count all organisms under and attached to the rock.
 - When all organisms have been counted GENTLY turn the rock back over.
 - Move to the next 10-meter section of the transect tape
 - (Example: Group 1 goes to 10-20 m and Group 2 goes to 80-90 m).
 - Repeat the above process until you have surveyed the entire transect.
- Transect 2:
 - Repeat the protocol for your second transect (low tide transect goes to high tide transect and vice versa).

Potential Questions:

- What observations/questions do you have?
- Why do you think we didn't count every organism along the whole transect?
- Why do we use random numbers to find places on the transect to collect data?
- Why do we turn the rock back over when we are finished counting organisms?
- Do you think sea-level rise will impact animals that live along the coast? Why or why not? What data tells you so?

Field Trip

Shara's House

- Walk student's up to Shara's House.
- Student's can sit on the back deck or the side of the house along the bench.
- Students relax in the shade and sip on homemade smoothies! :)

Snorkel

- Team Lead: give everyone a "return to shore" time.
- Students snorkel with their adult snorkel buddies.
 - Pass out scrunchies & anti-fog.
- Snorkel directly in front of Shara's House parallel to the shore.

Self-Reflection Day 3

Supplies:

- Rules for Writing (1/student)

Review Purpose of Self-Reflection

- See “Day 1: Self- Reflection” curriculum.

Rules for Writing

- Have students take turns reading the rules out loud.
 - *This helps to settle and center them in their space.*

Create a Word Pool

- Just like yesterday we will start by creating a word pool today.
- Each person will say one word about something they experienced today.
 - For example, cactus, water, thirst, etc.
 - (Write each of these on the whiteboard as you say them.)
- If someone has already said your word, try to choose another.
 - (Have students write these words in their notebook.)
- (Go around until every student has contributed a single word.)
- Let’s add the five senses to our word pool: hear, see, taste, touch, and smell.

Writing Prompt

- “I have a good life, but some days are harder than others. This is what I do to thrive and survive....”
- You will have 12 minutes to write about this prompt.
- Try to use as many of the words from the Word Pool as you can, don’t forget to include the five senses.
- In order to keep your pen to the page, start each new sentence with “And, then...”
 - For example, Today I woke up and heard someone snoring. And then I heard the quiet sound of water hitting the shore. And then I opened my eyes and saw seagulls overhead. And then...

Writing

- Prompt: **I have a good life, but some days are harder than others. This is what I do to thrive and survive....** [12 minutes with 2-minute warning]

Pair-Share

- (If time allows) Pair students up so they can read their writing to each other.

Share out

- Ask students to share their writing with the group.

Know it! Own it!
Day 3

Logistics

Supplies

- Laminated Index Cards with #1-25
- Sharpies (8)
- Ocean Discovery: Sea Turtle Bycatch Research 2014 (1/student)
- Vocabulary Stickers (1 of each/student)
 - Design Investigation
 - Control Group
 - Experimental Group
 - Bycatch
 - Target catch
 - Fishery
- Fisheries Hypothesis Stickers (1/student)

Set Up

- Make sure “Application of Science Discovery Process” chart papers from previous day is still hung up around the room.
- On whiteboard draw an illustration to help improve understanding of the importance of a Control Group (mice example below).

Timing

Time	Activity/Location	Breakdown
30 minutes	Analyze & Make a Difference	4:00 – 4:05 Know it! Own it! Overview 4:05 – 4:25 Analyze 4:25 – 4:30 Make a Difference
30 minutes	Science Discovery Process In-Depth	4:30 – 4:35 Preview Knowledge 4:35 – 4:45 Investigate: Design Investigation 4:45 – 5:00 Application of Science Discovery Process
40 minutes	Paper Airplane Lab	5:00 – 5:15 Paper Airplane: Investigation 5:15 – 5:45 Students Design & Record Investigation
20 minutes	Study Skills	5:40 – 5:45 Intro to Studying with Flash Cards 5:45 – 6:00 Study Time
25 minutes	Research Preview	6:00 – 6:10PM: Engagement 6:10 – 6:20PM: Fisheries Intro 6:20 – 6:25PM: Notebook Prep

Lesson**Analyze & Make a Difference**Know it! Own it! Overview:

- Welcome students to Know it! Own it!
- Growth Mindset. **(SLIDE)**
 - Let's take a moment to think about our mindset as it relates to our ability to learn new things in science.
 - Think-Pair-Share:
 - Has your mindset changed in any way? Why or why not?
 - Wherever you are on the growth mindset continuum is okay.
 - If you are on a more fixed mindset side, try to identify any challenges that come up for you today while talking about science.

Analyze

- Give students time to fill out their science notebook pages. **(SLIDE)**
 - (Have students open their science notebooks to "Sea-Level Rise" page.)
- We will now analyze the evidence we gathered today to see if we can accept or reject our hypothesis. **(SLIDE)**.
 - If we survey the types of animals in the low and the high tide zone, then the types of animals (will/will not) change.
- Analyze Data:
 - We need to look over and organize the data we collected to see if it supports or doesn't support our hypothesis.
 - Each group will:
 - Add up total numbers for each organism for both low and high tide zones on their data sheets. **(SLIDE)**
 - Discuss the questions on the slide as group. **(SLIDE)**
 - Which types of organisms do you see the most of in the high tide zone?
Low tide zone?
 - Does your data support or not support your hypothesis? Why or why not? Be specific by showing data that supports or doesn't support your hypothesis.
 - This answer might be different for different members of your group – that's okay.
 - Have each group share a response one of the above questions.

- Practice presentation skill: Speaking slowly and clearly.
- Encourage students to share different or opposing responses using their data.
- Accept/Reject Hypothesis (**SLIDE**)
 - Based on the evidence you collected and analyzed with your group, each person will return to their science notebook and accept or reject your hypothesis.
 - Accept hypothesis means your data supports your hypothesis.
 - Reject hypothesis means your data doesn't support your hypothesis.
 - There is nothing wrong with rejecting a hypothesis. Doesn't mean you got anything wrong.
 - Remind students that scientists never change their hypothesis, even if it's wrong.
 - We can learn just as much from a hypothesis we accept as from a hypothesis we reject.
 - Have each student return to their notebook and circle if they accept or reject their hypothesis and write 1-2 sentences explaining why. (**SLIDE**)
- Think-Pair-Share (**SLIDE**)
 - Question: How could sea-level rise impact animals that live along the coast of Bahia?
 - Scaffold Question: If the sea were to rise to the level of the high tide transect, how might it impact the organisms in the low tide transect? High tide transect?

Make a Difference

- We will now consider how to Make a Difference (**SLIDE**).
- Think-Pair-Share (**SLIDE**):
 - How could the information you collected today be used to make a difference in Bahia?

Science Discovery Process In-Depth

Preview Knowledge

- Review goal: **(SLIDE)**
 - Everyone can name and describe all parts of the Science Discovery Process.
- Preview Knowledge. **(SLIDE)**
 - Ask students what they already know about the Science Discovery Process.
- When we do Science Discovery Process In-Depth we will be taking notes using an outline of the Science Discovery Process.
 - Have students take out SDP Concept Map from their folder.
- Continuation of Investigate.
 - We are going to continue looking at the “Investigate” bubble.
 - Today we will focus on “Design an Investigation”. **(SLIDE)**
 - Have students:
 - Write “Design Investigation” in Investigate bubble.
 - Think-Pair-Share: What do you think Designing an Investigation means?

Investigate: Design an Investigation

- Define Investigation: a plan for testing a hypothesis. **(SLIDE)**
 - Once scientists have come up with a hypothesis, they must design an investigation to test their hypothesis.
- Experimental Group versus Control Group **(SLIDE)**
 - Often, but not always, when designing an investigation, a scientist needs to create both a control group and an experimental group.
 - Define Control Group: The group that you are exposing to “normal” conditions.
 - Define Experimental Group: The group(s) where you are changing something (variable).
 - Besides the one thing you are changing (variable), all other things should be identical between the control and experimental groups. **(SLIDE)**
 - Example **(SLIDE)**
 - Ask students what is different between the control and experimental groups?
 - Music (variable)
 - Ask students what is the same between control and experimental groups.
 - Everything else (table, chairs, computers, etc.)
 - Why have a control group? **(SLIDE)**
 - Control groups are critical during an investigation.

- Control groups allow you to show that whatever variable you applied to the experimental group caused the change.
- Without a control group a scientist can't say for certain what caused a change in the experimental group.

- Example: (**SLIDE** & Illustration)
 - (Use an illustration to highlight the importance of a control group in the below example.)
 - A scientist wants to test a blood pressure medication on mice.
 - He has 100 mice and gives them all the blood pressure medication.
 - The mice have reduced blood pressure after taking the medicine.
 - Unfortunately, without a control group people could say there were many other things that could have caused their blood pressure to drop – perhaps the music being played in the lab was more relaxing, or the mice had healthier food that day, or the mice were getting along better, etc.
 - If the scientist took the 100 mice and divided them into two groups and gave 50 of the mice the blood pressure pill (experimental group) and 50 of the mice received a similar looking pill (placebo) that had no medicine (control group) and all other conditions were the same (all 100 mice are kept in the same lab, in the same cages, same music and food, etc.), then if the 50 mice who received the blood pressure medication had lower blood pressure than the other 50 mice who did not, scientists could assume that the blood pressure medication was what lowered the blood pressure of the 50 mice.

- Hand out Design Investigation, Control Group, and Experimental Group vocabulary stickers.
 - Have students add these to their SDP Concept Map next to “Investigate Bubble”.

Application of Science Discovery Process:

- Overview
 - In a moment you will have an opportunity to apply this new knowledge.
 - Applying knowledge means taking new knowledge and applying it to a new circumstance.
 - Applying knowledge is part of Know it! (point to head) and Own it! (make a fist).

 - You will return to the poster you worked on yesterday: (**SLIDE**)
 - Design an investigation to test the hypothesis you came up with yesterday.
 - You will need to label your control and experimental group and explain why you have labeled each of them that way.

 - Once your group has designed an investigation you will need to elect one person to be the presenter for your group.

- The presenter will share with the whole group the observation, hypothesis, and investigation design your group came up with.
 - The presenter cannot be the same person as yesterday.
 - When presenting today we will focus on using a “strong voice”.
- If time allows, let your presenter practice and provide feedback.
- Application Activity
 - Example #1:
 - Observations: Some of the plants in my mom’s garden are short and some are tall. My mom puts fertilizer on some of her plants but I’m not sure which ones.
 - Question: I wonder if fertilizer can affect how tall it will grow?
 - Hypothesis:
 - Investigation:
 - Example #2:
 - Observations: Sometimes I study for tests and sometimes I don’t. My grades are different in every subject.
 - Question: Does studying effect my grades?
 - Hypothesis:
 - Investigation:
 - Example #3:
 - Observations: Sometimes water shot out of a water gun goes further than other times. People shoot water out of their water guns at different angles.
 - Question: I wonder if the angle of the water gun effects how far the water will go?
 - Hypothesis:
 - Investigation:
 - Example #4:
 - Observations: I fed my new fish Food A the first month I had them, then I fed them Food B the second month I had them. I think they are getting bigger faster now.
 - Question: Does Food A or Food B help fish grow faster?
 - Hypothesis:
 - Investigation:
- Debrief
 - Have each group present.
 - Focus on having the presenter use a strong voice – have them start over if necessary.

Paper Airplane Lab

Paper Airplane: Investigation

- We will continue applying our new knowledge by designing an investigation of our own.
 - Each group will return to the hypothesis they agreed to test yesterday.
 - Your goal will be to take this hypothesis and design an experiment to test it.

- Design an investigation.
 - When designing your investigation label the control and the experimental versions.
 - Remember the experimental group is where you are changing something (variable).
 - Example 1: **(SLIDE)**
 - Hypothesis: If I make the wings on my paper airplane wider than 2 inches, then my plane will fly further.
 - Investigation:
 - Create a paper airplane with wings that are two inches wide **(control)**
 - Create paper airplanes with wings that are four inches wide, six inches wide, and 8 inches wide **(experimental)**.
 - Fly all paper airplanes and measure the distance they fly.
 - Example 2: **(SLIDE)**
 - Hypothesis: If I cut my paper airplane wings into a curve, then my plane will be able to fly in a circle.
 - Think-Pair: Ask students to try and design an experiment to test this hypothesis.
 - Investigation:
 - Design two paper airplanes.
 - One with straight wings **(control)** and one with wings cut into a curve **(experimental)**.
 - Fly both paper airplanes and observe if they fly in a circle.
 - Each group will need to: **(SLIDE)**
 - Design an investigation to test your hypothesis.
 - Label the control and experimental groups.
 - Get approval from a Team Lead on investigation design.
 - Record the investigation design in your science notebook.
 - In “Paper Airplane Lab” section.
 - Header: Investigation Design

Students Design & Record an Investigation

- Check in with each group while they work.
- Once approved have ALL students record the investigation in their notebook.

- If students finish early – use extra time to study flash cards.

Share Investigation Designs (*if time allows*)

- Have 2-3 groups share their hypothesis and investigation design.
 - Have the other students determine the control and experimental versions.

Study Skills

Intro to Studying with Flash Cards

- Why are we learning study skills? **(SLIDE)**
 - Flash cards and study time – are tools that can be used to support our learning.
 - Remember one of our objectives for the program is that each of you can name and can describe all the parts of the Science Discovery Process. **(SLIDE)**
 - Each of you will take a mid-term and final exam to assess this.
 - Study skills can help us prepare for those exams or any other exams we have to take in our life.
- Science of Study Time
 - A lot of research has been done on how people study.
 - Here's what science tells us about studying:
 - Short study sessions are better than long study sessions. **(SLIDE)**
 - Several study sessions before a test are better than cramming for just a day or two before.
 - Several short study sessions over a period of several days will increase your ability to remember knowledge.
 - Therefore, we will have a short time to study each day during Know it! Own it! to help you prepare for your exams.
 - How you use your study time is just as important as how long you study for.
 - Some of the best things you can do during study time are: **(SLIDE)**
 - Utilize a study skill, such as flash cards or reviewing concept maps
 - Stay focused for the short time you are studying!
 - Don't multi-task (no phones or off topic conversations)
- How to use flash cards to study. **(SLIDE)**
 - When you look at flash cards you are trying to memorize what is on them.
 - Read them to yourself.
 - If you can remember what is on both sides correctly, put that card in one pile and if you can't put it in another.
 - Spend more time reading and rereading the cards from the pile you don't know.
 - Every now and then mix up the order of your flash cards.
 - Try it in reverse- read the definition, can you say the word?

Study Time

- Give students five minutes to study their flash cards independently.
 - Remind students that science tells us we should be focused during this short study time.
- If time allows, have students partner up and test each other using their flash cards.

Preview ResearchEngagement

- Think-Group-Share:
 - Think (**SLIDE**):
 - You will be given two graphs of data collected by past Ocean Leaders.
 - This data is directly related to the research you will do tomorrow.
 - Graphs are one way science leaders communicate about their work.
 - Without any other background information try to answer the questions.
 - Questions:
 - What do you think is the difference between control and experimental nets?
 - What do you think science leaders learned about sea turtle catch rates? Target catch rates?
 - Demonstrate how to mark-up the data sheet while they are thinking, record ideas, ?'s for unknowns, etc.
 - Give each person a copy of Ocean Discovery: Sea Turtle Bycatch Research 2014.
 - Group:
 - With your group discuss your thoughts about the questions on the slide.
 - Divide students into small groups (2-3 students).
 - Share:
 - Have each group give responses to the questions on the slide. Ask for different or opposing responses. Give students time to debate different responses.
 - Be sure to clarify:
 - What do you think is the difference between control and experimental nets?
 - Control nets had orange lights turned OFF, Experimental nets had orange lights turned on.
 - Why would science leaders even bother having lights on the Control nets at all?
 - What do you think science leaders learned about sea turtle catch rates? Target catch rates?
 - Nets with lights turned ON caught less sea turtles than those with lights OFF.
 - Nets with lights ON caught less of target fish than nets with lights OFF (but not by much).
 - Target catch means the type of fish a fisherman wants to catch.
 - What do these graphs communicate to you?
 - Sea turtles benefit from lighted nets
 - Lit nets reduced capture of sea turtles by 50%.

- Target catch rate was slightly reduced.
 - This difference is actually not statistically significant. If you feel like your students can understand that you could explain that concept as well.
- If time allows: Do you think fishermen would use these lights on their nets? Why or why not?

Fisheries Intro

- Fisheries Introduction:
 - Tomorrow we will build on this research on local fisheries here in Bahia.
 - Define Fishery: the occupation or industry of catching or rearing fish. (**SLIDE**)
 - Fisheries can also refer to the locations where seafood is caught, or the business of catching the species.
- BAHIA Fisheries:
 - Bahia is a small-scale coastal gill net fishery (**SLIDE**).
 - A gillnet is a wall of netting that hangs in the water column, typically made of monofilament.
 - Mesh sizes of the gillnet are designed to allow fish to get their head through but not their body. The fish's gills then get caught in the mesh as the fish tries to back out of the net.
 - Gillnet fisheries are one of the most common forms of fishing throughout the world.
 - By-catch (**SLIDE**)
 - Unfortunately, this type of fishing has high rates of bycatch (shark spp., turtle spp., fish spp., etc.).
 - Define Bycatch: is when other marine species, which aren't the fisherman's target species, are caught.
 - Sea Turtles (**SLIDE**)
 - Sea turtles are one species that have been subject to bycatch over the years.
 - Turtles need to come to the surface every few minutes to breathe, but when they get caught in gillnets, they are unable to surface and can die.
 - Ocean Discovery Research (**SLIDE**)
 - In the past, Ocean Discovery has worked with several scientists to study ways to reduce sea turtle bycatch from gillnet fishing, including the use of sensory-based deterrents.
 - Sensory-based deterrents (**SLIDE**)
 - Sensory-based deterrents attempt to help an animal use its senses (sight, hearing, smell, taste, or touch) to locate a net and be able to avoid it.
 - Ocean Discovery students and their scientist mentors have tested visual (attaching shark shapes – a natural predator or sea turtles and lights to nets so

animals can see them) and acoustic deterrents (attaching speakers to nets so animals can hear them).

- The data you looked at earlier was using a visual deterrent – orange lights to help turtles see the nets before running into them.
- Target Catch (**SLIDE**)
 - Ocean Discovery students and mentors also studied how these devices impact a fishermen’s target fish collection rate.
 - Define Target Catch: is the type of fish a fisherman is trying to catch.
- Think-Pair-Share (**SLIDE**):
 - Why do you think it is important that any deterrent used to prevent bycatch doesn’t impact a fisherman’s target catch?
 - Be sure to discuss:
 - It is important to look at this because fishing is the fishermen’s livelihood and if we want them to utilize sensory deterrents, we must also show that using them does not impact their target catch rates. Additionally, the cost, durability, and ease of use of the deterrents is important if we want fisherman to adopt these devices.
- Fishing with Traps (**SLIDE**)
 - Summer fishing in Bahía de los Ángeles is often done with traps versus gillnets.
- Target & Bycatch (**SLIDE**)
 - Target:
 - Octopus (Pulpo)
 - Seabass (Cabrilla)
 - Trigger Fish (Cochito)
 - Bycatch:
 - Manta Ray (Manta raya)
 - Pufferfish (Pez globo)
- Field Research (**SLIDE**)
 - This year we will expand on past research to see if the use of a visual deterrent (lights) on traps will reduce the amount of bycatch while not impacting the fisherman’s target catch.
 - Ask students:
 - Which traps would be the control? Experimental?
 - Should we put lights on the control trap? Why or why not?
- Hypothesis (**SLIDE**):
 - Ask student to define hypothesis.
 - Hypothesis: an educated guess based on information you already know.
 - Discuss and clarify hypotheses with students.
 - 1. **If** fishermen use lights on their traps, **then** (it will/will not) reduce bycatch.

- 2. If fishermen use lights on their traps, **then** (it will/will not) reduce their target catch.
- Investigate (**SLIDE**):
 - We will collect data to determine if lighted traps:
 - Reduce bycatch
 - Reduce target fish catch
 - Hector, a local fisherman, will go out in the early morning to bait and set his traps.
 - He will set an equal number of control and experimental traps
- Roles (**SLIDE**):
 - Each boat will pull up to Hector boat and climb aboard.
 - On board you will pull up one control trap and one experimental trap and record your data.
 - Roles:
 - Trap puller: Wears gloves and helps Hector pull the trap in.
 - Data recorder: Has clipboard with datasheet and pencil. Listens to the species name and makes a tick mark on the datasheet for each one collected.
 - Fish handlers: Unload the trap and says the species name of each fish (helped by Hector) to be recorded by data recorder.
- Echo Recording (**SLIDE**):
 - Define Echo Data Recording: repeating what you hear back to data recorder to ensure accuracy.
 - The fish handler says the species of fish and the data recorder repeats the species back and records it on the datasheet.
- Datasheet (**SLIDE**):
 - All data will be recorded on this sheet.
 - Be sure to record data in the correct trap (Experimental or Control)
 - For each fish caught:
 - If it the first of its type in this trap:
 - Write its name under species name.
 - Put a check mark under Bycatch or Target species
 - Put a tick mark under number counted.
 - If it has been noted before in this trap:
 - Put a tick mark under the number counted only.

Notebook Prep:

- Prep Science Notebooks (**SLIDE**):
- Hand out Hypothesis Stickers.
 - Have students place in science notebook.

- Have students circle their proposed hypothesis.
- Hand out vocabulary stickers for student to place in notebook under Vocabulary:
 - Fishery
 - Bycatch
 - Target catch

Science Notebook

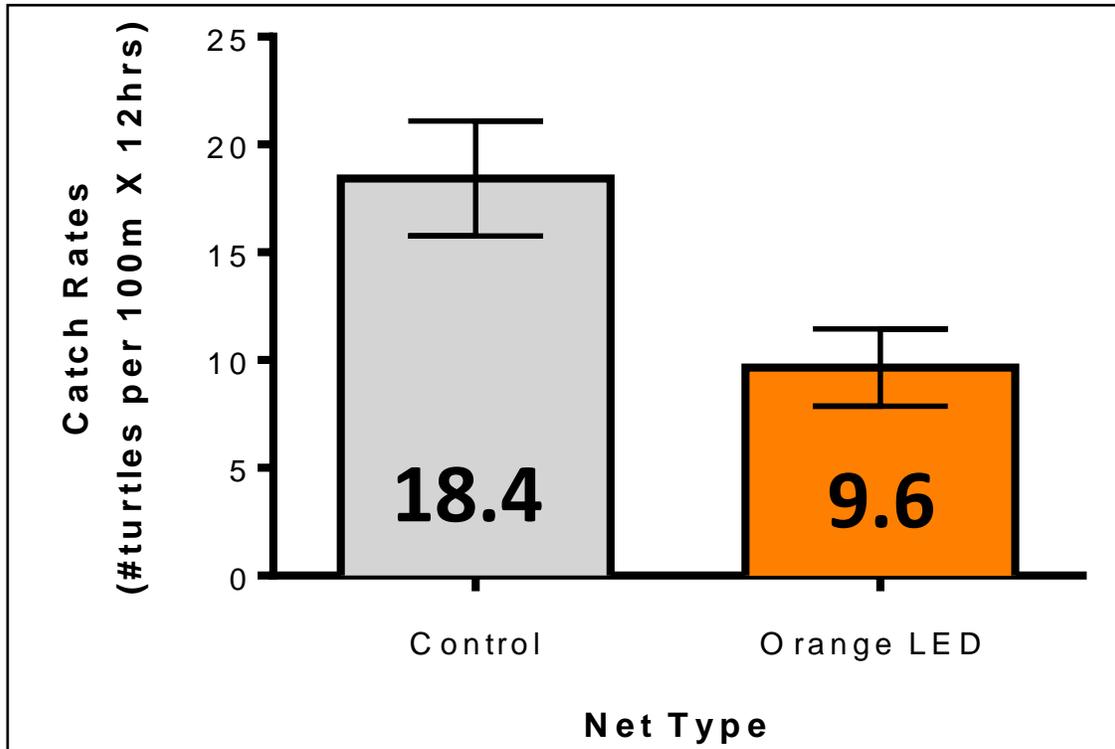
Field Research: Fisheries		Investigate
Explore & Wonder		Hypothesis:
Observations	Questions	
		Vocabulary

Clean-up

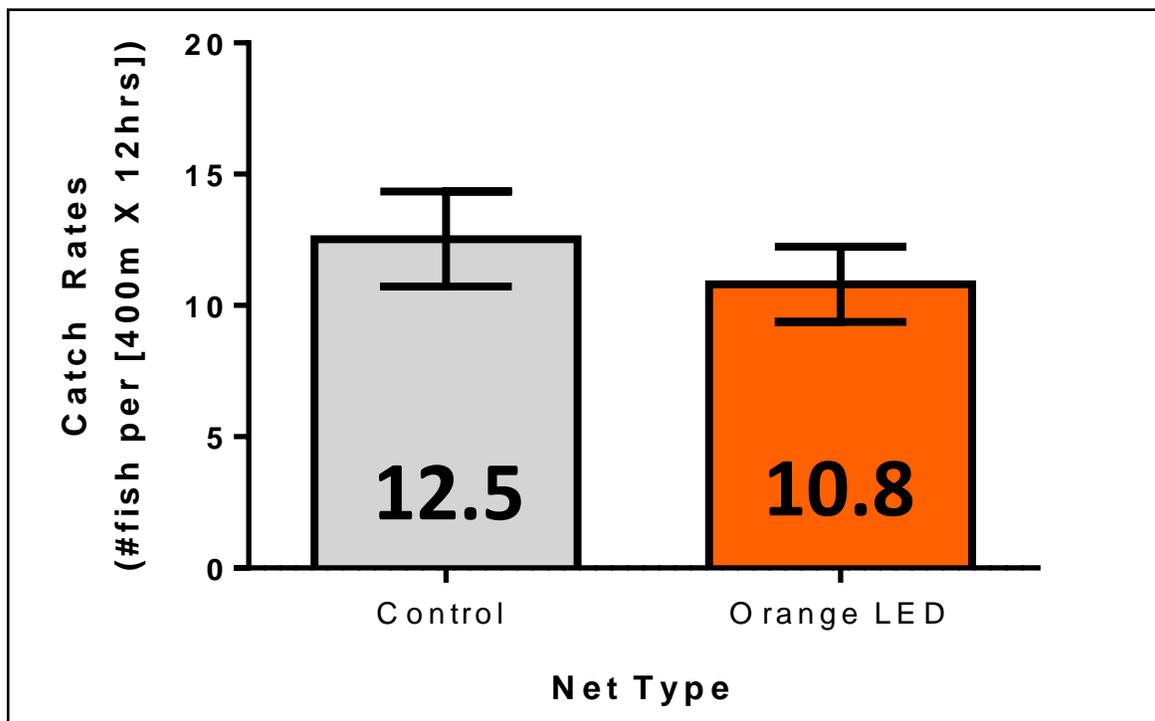
- Review clean-up procedure from yesterday.
- Dismiss students as they are done.

Ocean Discovery: Sea Turtle Bycatch Research 2014

Sea Turtle Catch Rates



Target Fish Catch Rates



**Day 4: Fisheries
Implementation Agenda**

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Field Research	Team Leads
12:25 pm	Return to Field Station - Check student medication back into first aid station	Team Leads
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence -or- Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Siesta	PM Lead 1
2:30 pm	Salud	PM Lead 2
4:00 pm	Know it! Own it!	Field Research Manager & Team Lead 2
6:30 pm	Dinner	Program Manager
7:05 pm	Servant Leadership	PM Lead 1
7:35 pm	Exercise	PM Lead 2
8:30 pm	Sleep Prep	PM Lead 1
9:00 pm	Bedtime	PM Lead 2

Community Building

Day 4

Timing:

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- N/A

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).

Food & Conversation

Question: Where is somewhere you would like to travel to? What would you want to do/see there?

Review Community Question:

- (Read today's question out loud.)

Community Building Activity: Shout Outs!

Overview: Taking time to recognize when someone else has been brave or overcome a challenge.

Introduction:

- In a community environment like this where we are living, learning, and work together it is important that we recognize others for their contributions to the team.
- It is also good to take a moment to focus on others instead of ourselves.

Directions:

- We will recognize people who have been brave, have overcome a challenge, have been their best-self, or contributed to the team, by giving that person a Shout Out.
- When you give a shout out – use a strong voice. Speak clearly and slowly so that everyone around you can hear the shout out you are giving another person!
- You can give a Shout Out! to anyone, student, staff, or mentor.
- Example:
 - “I want to Shout Out Isabela, because she has gone out of her way to make sure all the cleaning supplies are put away at the end of Chores every day. It helps keep the field station tidy and helps Alejandrina, so she doesn't have extra work to do after a full day of cooking for everyone. Thanks Isabela!”
 - **Instructor Note: Try to make the example Shout Out! a real Shout Out! for a student if possible.**
 - Some areas you could consider giving shout-outs for:

- Being Brave – a person who took a risk, did something they were afraid of or nervous about, etc.
- Being Their Best Self – a person who has been curious, respectful, considered the safety of themselves or others, someone who invited others into a group or conversation, etc.
- Having a Growth Mindset – a person who faced a challenge, someone who asked for help when facing an obstacle, etc.

Activity:

- Do as many Shout Outs! as you have time for.

Debrief:

- We will have a chance to do Shout outs! a couple more times, so keep your eye out for others who are going above and beyond!

Morning Announcements

- Review daily schedule and any boat/snorkel groupings.
- Reminder new mentors arriving tonight
- Review gear for the day:
 - Wear: a swimsuit, water shoes or closed-toed shoes, hat, sunglasses, short/long sleeves.
 - Backpack: Science notebook and pencil, towel (optional)
 - Fill and bring a water bottle.
 - Snorkel gear & wetsuit
 - Apply sunscreen.
- Ask Facilities Manager if they have any updates to share.

Field Research
Fisheries

Overview

Research Contact: Hector Morales (Bahía de los Ángeles)

Research Location(s):

- Herradura is best for setting traps

Supplies:

- Field Research:
 - o All Supplies on **General Field Research Supplies Check List** (see above)
 - o Fisheries Datasheet copied on Write in the Rain paper (6)
 - o Fisheries Field Research Protocol for Mentors (8)
 - o Gloves (for pulling in traps) (2/pairs)
 - o Clipboard + pencil (8)
- Field Research Supplies to be given to Hector a minimum of two days before research:
 - o Glow sticks (36)
 - 18 to be attached and lit
 - 18 to be attached and not lit
 - o Zip ties
 - o Flagging tape (1 roll)
 - o Fishing traps + bait (12)* – (Supplied by Hector)
 - *Each “boat” of students should pull up a control and an experimental trap so the number of traps may change (i.e. = total of 5 boats means 10 traps (2/boat)).

Logistics:

- Hector and Community Relations person will go out before students to set traps.
 - o Each round of students will pull and record data for four total traps (2 control and 2 experimental)
- **When creating rotations: Hector’s boat can only accommodate 8 passengers MAX.**
 - o Hector + Community Relations person (must be a Spanish speaker) + 6 boat passengers.
- Field Research Manager will join this day to lead Boats 5 & 6.

Timing:

Time	Activity/Location	Breakdown
7:00AM	Shara & Hector to Set Traps	*This will be done without the students. <ul style="list-style-type: none"> • All traps should have three lights tied on with 2-3 zipties each. • Experimental traps should be labeled with flagging tape at surface buoys.
7:15 – 8:00AM	Prep & Transportation: Field Station	7:15 – 7:25AM: Students Prep for Field 7:25 – 7:35AM: Gear Check 7:35 – 7:50AM: Drive to Boat Ramp 7:50 – 8:00AM: Park, Unload & Final Gear Check

8:00 – 12:00PM	Field Research & Field Trip: Field	8:00 – 9:15AM: Round 1 <ul style="list-style-type: none"> • Boats 1 & 2: Collect data w/ Hector • Boats 3-6: Field Trip 9:15 – 10:30AM: Round 2 <ul style="list-style-type: none"> • Boats 3 & 4: Collect data w/ Hector • Boats 1, 2, 5, 6: Field Trip 10:30 – 11:45AM: Round 3 <ul style="list-style-type: none"> • Boats 5 & 6: Collect data w/ Hector • Boats 1-4: Field Trip 11:45 – 12:00PM: Return to boat ramp
12:00 – 12:25PM	Return to Field Station	12:00 – 12:15: Unload & drive back to field station 12:15 – 12:25PM: Unload & Rinse Gear

Overview of Research (Instructors Only):

Students will be building on prior research done by Ocean Discovery Institute, looking at how visual deterrents (shark shapes, lights) can be used to reduce bycatch, but not target species catch rate, in Bahía’s coastal gill net fishery. All prior research was conducted on gill nets, however, much of summer fishing in Bahía de los Ángeles is done with traps and students will expand on previous research by looking at how visual deterrents work on traps. **The goal is for students to determine if the use of a visual deterrent (lights) on traps would reduce the amount of bycatch (puffer fish and small manta rays) while not impacting the fisherman’s target catch in traps (octopus, trigger fish, and sea bass).**

Field Research

Data Collection

- Before leaving the dock:
 - Confirm that all boat captains know where Hector is located.
 - Confirm times to meet at Hector's boat for data collection.
- Field trip groups depart the dock for:
 - Wildlife watching
 - San Juan Cove
- Data Collection group will go and meet Hector's boat.
 - If there are six students or less on both boats- transfer all students to Hector's boat to collect data together.
 - If there are more than six students:
 - Transfer the students from one boat onto Hector's boat.
 - The students on the other boat can use their science notebook and record observations/questions.
 - After the first group has pulled an experimental and a control trap, switch groups.

Data Collection (on Hector's Boat)

- Assign roles to students:
 - Trap puller (1): Wears gloves and helps Hector pull the trap in.
 - Data recorder (1): Listens to the species name and makes a tick mark on the datasheet for each one collected. Has clipboard with datasheet and pencil.
 - Fish handlers (1-2): Unload the trap and says the species name of each fish (helped by Hector) to be recorded by data recorder.
- Review Echo Data Recording:
 - The fish handler says the species of fish and the data recorder repeats the species back and records it on the datasheet.
 - Any species that haven't been added to the sheet can be added to the blank spots.
- Pull Control Trap (NO flagging tape):
 - Once trap is in the boat collect data using "Echo Data Recording."
 - **One data sheet will be used by all groups!**
 - Fish handlers should place target species in buckets and release bycatch species.
- Students switch roles.
- Pull Experimental Trap (Flagging Tape):
 - Repeat the above.

Data Collection (not on Hector's boat)

- Record observations and questions in science notebook.

Be sure the last group takes the datasheets and gives them to the Field Research Manager!

Potential Questions to ask students throughout the day:

- Which traps are the control and which are the experimental? How do you know?
- Why do you think we set so many traps instead of just one control and one experimental?
- Why is it important to see if the LED lights impact the fishermen's target catch rate?
- If the data shows that lighting the nets helps reduce sea turtle by-catch is there any reason that fishermen might find using these lights difficult?
 - Are there disadvantages? Are there other options?
- Can you think of any reasons why implementing something like this on a large scale could be difficult?
- How would you improve the design of this investigation?

Experimental Traps

Species Name	Bycatch or Target	Number Counted
	<input type="checkbox"/> Bycatch <input type="checkbox"/> Target	
	<input type="checkbox"/> Bycatch <input type="checkbox"/> Target	
	<input type="checkbox"/> Bycatch <input type="checkbox"/> Target	
	<input type="checkbox"/> Bycatch <input type="checkbox"/> Target	
	<input type="checkbox"/> Bycatch <input type="checkbox"/> Target	
	<input type="checkbox"/> Bycatch <input type="checkbox"/> Target	
	<input type="checkbox"/> Bycatch <input type="checkbox"/> Target	
	<input type="checkbox"/> Bycatch <input type="checkbox"/> Target	
	<input type="checkbox"/> Bycatch <input type="checkbox"/> Target	
	<input type="checkbox"/> Bycatch <input type="checkbox"/> Target	

Self-Reflection Day 4

Supplies:

- Rules for Writing (1/student)
- Thank You Cards (2/student) + 10 additional
- Pencils (1/student)
- Clipboards (1/student)
- Thank You Speech card (6)
- Whiteboard + easel (1)
- Dry erase marker (1)

Set Up

- Write sentence starters on the whiteboard (see below).

Rules for Writing

- Have students take turns reading the rules out loud.

Writing Prompt #1

Overview:

- Today we are going to start by making quick lists.
- When making a quick list don't think too much, just write what comes to mind.
- It doesn't matter if you don't finish the lists in time allotted.
- It's just a warm-up for the longer prompt.

Writing

Prompts:

- **List 1: Five things I love to do:** [30 seconds]
- **List 2: Five things I hate to do:** [30 seconds]
- **List 3: Five things I love to eat:** [30 seconds]
- **List 4: Five things I want but can't have:** [30 seconds]
- **List 5: Five things I have never experienced before until this trip:** [30 seconds]
- **List 5: Five things I want to happen before I go back to San Diego:** [30 seconds]

Writing Prompt #2

Overview:

- "I am learning a lot, and it's making me think I am capable of..."
- You will have 7 minutes to write about this prompt.

Writing

- Prompt: **I am learning a lot, and it's making me think I am capable of...** [7 minutes with 2-minute warning]

Share out

- Ask students to share their writing with the group.

Writing #3: Personal Thank You Cards

Overview:

- Networking is a tool for **Full hearts! Powerful minds!**
- Networking not only includes introducing yourself but making sure you say thank you after meeting or working with another person.
- Recognizing that someone else has gone out of their way to spend time or work with you is meaningful. Our mentors all spend time with you here in Baja because they believe in you. They believe that you can be the science leaders of tomorrow.
- Now is our time to say “Thank You” to them. Thank You’s should be personal if possible. Think about the ways that person has interacted with you. Helping you to understand something, sharing their journey to becoming a science leader, taking time to paddle board or snorkel with you, talking with you about things you find challenging, etc.
- Try to be specific about your experiences with your mentors. It is more meaningful and shows that you are genuinely grateful when you take the time to give a personal thank you.

Directions:

- Everyone will write a personal thank you card for each of the mentors that have been working with you for the last four days.
- There are some sentence starters on the board to help but feel free to write whatever is meaningful to you.
 - One memory I have of our time together is....
 - Something I enjoyed experiencing with you was...
 - You taught me...
 - You really helped me by....
 - Thank you for....
- We will collect these cards and give them to the mentors before they leave tomorrow morning.
- If there is another mentor who wasn’t in your group but that you want to write a card for just raise your hand and we will bring you an extra card.

Writing:

- Give 5-, 3- and 1- minute reminders of time left.
- While students are writing:
 - **A student must be selected for each mentor** to give the personal thank you when photo frame and cards are handed over.
 - Once students are selected explain their role, give them the “Thank-You Speech” card and have them fill it out.
 - Practice giving the thank-you speech with your students with a focus on speaking with a strong voice and taking up space.
 - Collect their thank-you speech card and place it with the cards so that the student can have it during the presentation.
- In the last-minute walk around and collect cards.
 - Sort them into a pile for each mentor.
 - Tie cards up in a pretty pile with twine (this will be part of their departure gift tomorrow).
 - Place a yellow sticky note on top of each pile with the mentor’s name.

Know it! Own it!
Day 4

Logistics

Supplies

- Laminated Index Cards with #1-25
- 100m transect tape (4)
- Small orange cones (8)
- Vocabulary Stickers (1 of each/student)
 - Observational Study
 - Controlled Experiment

Set Up

- Make sure “Application of Science Discovery Process” chart papers from previous day is still hung up around the room.
- Take data from fisheries datasheet and transfer it to the whiteboard so that all students can see it.
- Create two “runways” for paper airplane testing (see Day 1 Know it! Own it! for diagram).

Timing

Time	Activity/Location	Breakdown
25 minutes	Analyze & Make a Difference	4:00 – 4:20 Analyze 4:20 – 4:25 Make a Difference
35 minutes	Science Discovery Process In-Depth	4:25 – 4:30 Preview Knowledge 4:30 – 4:40 Investigate: Design Investigation 4:40 – 5:00 Application of SDP
30 minutes	Paper Airplane Lab	5:00 – 5:30 Catch up/Test Investigation Design
25 minutes	Study Skills	5:30 – 5:35 Intro to Studying with Concept Maps 5:35 – 5:40 Ask an Expert 5:40 – 5:50 Updating Your Concept Map 5:50 – 5:55 Pair-Share
25 minutes	Preview Research	5:55 – 6:05: Engagement 6:05 – 6:15: Whale Shark Q & A 6:15 – 6:20: Notebook Prep 6:25 – 6:25: Clean-up

Lesson**Analyze & Make a Difference**Analyze

- Give students time to fill out their science notebook pages. **(SLIDE)**
 - Have students open their science notebooks to “Fisheries” page.

- We will now analyze the data we collected today to see if we can accept or reject our hypothesis. **(SLIDE)**.
 - (Show Analyze in Science Discovery Process.)
 - If fishermen use lights on their traps, then (it will/will not) reduce bycatch. **(SLIDE)**
 - If fishermen use lights on their traps, then (it will/will not) reduce their target catch.

- Investigation Design: **(SLIDE)**
 - Which was the control trap? Experimental? How do you know?
 - Why did we attach unlit lights to the control trap?

- We need to look over the data we collected to see if it supports or doesn’t support our hypothesis.
 - (Point out data on the board.)
 - This is the data from the datasheets you used on Hector’s boat.

- Pair-Share
 - Have students look over the data and discuss the questions on the slide as group with their mentor **(SLIDE)**.
 - Does our evidence support or not support your hypothesis? Why or why not?
 - Be specific by showing data that supports or doesn’t support your hypothesis.
 - Have each group share a response one of the above questions.
 - Practice presentation skill: Speaking slowly and clearly.
 - Encourage students to share different or opposing responses using their data.

- Accept/Reject Hypothesis **(SLIDE)**
 - Return to your notebook and individually accept or reject your hypothesis and explain why using 1-2 sentences.
 - Accept hypothesis means your data supports your hypothesis.
 - Reject hypothesis means your data doesn’t support your hypothesis.
 - Discuss as a group whether or not to accept/reject the hypothesis based on the data collected.

Make a Difference

- We will now consider how to Make a Difference (**SLIDE**).
- Think-Pair-Share (**SLIDE**):
 - How could the information you collected today be used to make a difference in Bahia?
 - How did it feel to do this type of science? Did you like collecting data with Hector? Why or why not?

Science Discovery Process In-Depth

Preview Knowledge

- Review goal: **(SLIDE)**
 - Everyone can name and describe all parts of the Science Discovery Process.
- Preview Knowledge. **(SLIDE)**
 - Ask students what they already know about the Science Discovery Process.
- When we do Science Discovery Process In-Depth, we will be taking notes using an outline of the Science Discovery Process.
 - Have students take out SDP Concept Map from their folder.
- Continuation of Investigate.
 - We are going to continue looking at the “Investigate” bubble. **(SLIDE)**
 - Today we will focus again on “Design Investigation”.

Investigate: Design an Investigation

- Observational Study vs. Controlled Experiment
 - Two types of investigations – Observational Study and Controlled Experiment. **(SLIDE)**
 - Controlled Experiment: an investigation with at least two groups, where all factors are kept the same except for one variable. Example:
 - Question: Does studying vocabulary help students do better on a math test? **(SLIDE)**
 - Hypothesis: If students study math vocabulary before a test, then they will score higher on the test than students who don’t.
 - Investigation: Four classes from the same math teacher are each given two hours to study for an upcoming quiz.
 - Two of the classes are given flash cards with common math vocabulary. They are told to study the flash cards for 30 minutes of the two-hour study time. (Experimental Group)
 - Two of the classes study for two hours without vocabulary flash cards. (Control Group)
 - Quiz scores for each class will be collected.
 - There are times when it is not possible to have a control and an experimental group. That is when we might use an Observational Study instead.
 - Observational Study: an investigation which gathers evidence about a subject without changing or altering anything. **(SLIDE)**
 - Question: Do bears sleep the same amount all year? **(SLIDE)**

- Investigation: a scientist sets up a camera to observe a bear den and everyday records the time the bear leaves the den (wakes up) and the bear returns to the den (goes to sleep).
- Here the scientist changes nothing – they are simply observing and gathering evidence: the amount of time a bear sleeps.
- Observational studies are often referred to as “monitoring”.
 - Monitoring refers to watching and observing something.
 - Example:
 - Question: Is the population of chuckwalla lizards stable?
 - Investigation: a science leader could set up transects in the desert to count the number of chuckwallas, then come back on a yearly basis and repeat that investigation to see if anything changes – that would be considered monitoring.

Application of Science Discovery Process:

- Overview
 - In a moment you will have an opportunity to apply this new knowledge.
 - Applying knowledge means taking new knowledge and applying it to a new circumstance.
 - Applying knowledge is part of Know it! (point to head) and Own it! (make a fist).
- Application Activity
 - **Three Corners Activity**
 - I will put an example of an investigation on the board.
 - Determine if the investigation is an observational study or controlled experiment.
 - If it’s a controlled experiment determine the control group, experimental group and the variable.
 - Investigation #1 (**SLIDE**)
 - Question: Does Fish Food A or Fish Food B help fish grow faster?
 - Investigation: A science leader has 16 fish that are all four centimeters long. Eight of the fish are fed Fish Food A and the other eight fish are fed Fish Food B. All fish are measured every four days for three months.
 - Investigation #2 (**SLIDE**)
 - Question: Does eating organic food have an overall effect on health?
 - Investigation: A research found 100 people who only eat organic fruits and vegetables and 100 people who don’t eat organic fruits and vegetables. Each person was given a physical.
 - Investigation #3 (**SLIDE**)
 - Question: Do kids cry more in the morning or the afternoon.

- Investigation: A researcher visited 10 different Kindergarten classrooms and recorded the time of day anytime a student cried. Morning was 9AM-12PM and afternoon was 12PM-3PM.
- Investigation #4: (**SLIDE**)
 - Question: Are increasing ocean temperatures impacting the size of bluefin tuna?
 - Investigation: For two weeks every summer, a researcher sets two fishing lines in the water every day for two hours. Any bluefin tuna that is caught is measured and then released. The researcher repeats this study every summer for 20 years.
- Investigation #5 (**SLIDE**)
 - Question: Does soil type effect how quickly a plant will sprout?
 - Investigation: A researcher takes five identical pots, fills each with a different type of soil, plants an identical seed in each pot, places the pots in a sunny window, waters them equally, and measures how long it takes for the seeds in each pot to sprout.
- Hand out Observational Study and Controlled Experiment vocabulary stickers.
 - Have students add these to their SDP Concept Map next to “Investigate Bubble”.

Paper Airplane Lab

**Teaching Note: this is an opportunity to get all students on track with having a testable hypothesis and a strong investigation design.*

Catch up/Test Investigation Design

- Observational Study or Controlled Experiment
 - Ask students if their Paper Airplane experiment is an observational study or controlled experiment?

- All groups will continue working on investigation design. (SLIDE)
 - Start with getting your investigation design approved by a Team Lead. Be sure:
 - You have labeled your control group, experimental group, and variable.
 - Be sure everyone in your group has your investigation design recorded in their science notebook.
 - Test your investigation design.
 - Go outside to the testing zone to test your investigation design.
 - Things to think about:
 - What is working and what is not working?
 - How do we need to modify our investigation design?
 - Often when science leaders begin their investigation something doesn't work out the way they planned so they have to make changes.
 - This is normal and part of the Science Discovery Process and part of having a growth mindset!
 - Today is a chance to test and adapt your investigation design.
 - Review testing zone expectations.
 - Be your best-self.
 - Be curious, respectful, and safe.

- (Release groups to work and check in with groups who need design approval.)
 - (Send Team Lead outside to supervise the testing zone.)

- (During the last 5 minutes – have all groups return to the classroom to record any changes to their design investigation.)

Study Hall

Intro to Studying with Concept Maps

- Review -why are we learning study skills?
 - Remember one of our objectives for the program is that each of you can name and can describe all the parts of the Science Discovery Process. **(SLIDE)**
 - Each of you will take a mid-term and final exam to assess this.
- Today we learn how concept maps can be used to help us study. **(SLIDE)**
 - Each of us has a concept maps we have been working on.
 - (Have students take out SDP Concept Map from their folder.)
- Review how concept maps work. **(SLIDE)**
 - Concept maps help us identify relationships between ideas and link them together.
 - Some of you may remember creating concept maps about invertebrates, fish, and marine mammals in the Bridge Program last summer.
 - Science tells us that understanding these relationships and making a visual representation of those connections can help you understand things at a much deeper level and make it easier for you to remember and retrieve the knowledge later. **(SLIDE)**
- Science Discovery Process Concept Map. **(SLIDE)**
 - We can see that we have already begun to create a concept map using the Science Discovery Process.
 - Point out how each student has added vocabulary to their concept map and added arrows to show the link between the vocabulary and the bubble it is attached to.
- Concept maps work best if you add to them yourself.
 - Adding to your concept map allows you to think about how things you have experienced fit into the concept map you are creating.
 - Example:
 - On our first field research day, I remember observing some Blue-footed Booby birds high up on the cliff side.
 - (Draw a line connecting Explore and Wonder bubble to a bubble with: "Observation: Blue-footed Booby birds sitting high on cliff side." written inside.)
 - It made me wonder: How are they able to stay up there without falling?
 - (Draw a connecting bubble from the above bubble and write in it: "Question - How are they able to stay up there without falling?")
 - Example:

- I realized that our Fisheries project was a Controlled Experiment.
- (Draw a line connecting the definition of “Controlled Experiment with " Fisheries Project".)
- Ask students to provide another example.
- Concept maps should make sense to you!
 - Everyone’s will look a little different.
 - Lines between bubbles means ideas are connected.

Ask an Expert

- Asking an Expert is another Growth Mindset tool. **(SLIDE)**
 - Some times when we are looking at new knowledge and trying to make connections, we realize there is something we didn’t understand or that we have a question about something.
 - That is when “Asking an Expert” comes into play.
 - Throughout Know it! Own it! when you have a question or need clarification or need help understanding something feel free to “Ask an Expert.”
- Who are experts?
 - People who have knowledge about the field you have a question about.
 - High school teachers, college professors, mentors, etc.
- Comfort level.
 - Having a growth mindset is important when seeking help.
 - Sometimes we feel like we should already “know” something and we feel like it makes us look “stupid” to ask about it.
 - Remember people with fixed mindsets are more concerned about how they look than actual learning. People with growth mindsets know they can learn anything they just don’t know it “yet” and asking for help is part of that process. Nothing stupid about it!
- Today while working on your concept map – if you have a question about something, look around and find an expert to ask!

Updating Your Concept Map

- Now it is time for you to add some things to your own concept map. **(SLIDE)**
- Give students time to work on their own concept map.

Pair-Share

- Students to pair up and share their concept maps.
- Ask students to share some of the things they added to their concept map.

Preview Research

Engagement

- Whale Shark Feelings
 - Tomorrow we will snorkel with whale sharks.
 - (Show video of a whale shark.) **(SLIDE)**
 - (Show a picture of a whale shark.)
 - There may be many thoughts/ideas/questions/feelings we have about this.
 - I am going to ask each of you to take a moment to write down 1-5 words about how you are feeling about swimming with whale sharks. **(SLIDE)**
 - (Hand each student a half piece of paper record their feelings about swimming with whale sharks.)
 - When you are done, crumple the paper with your feelings into a ball.
 - (Collect papers in a bin.)
 - Uncrumple all papers from the “feeling” bin and read them aloud.
 - Acknowledge all feelings about what they are doing tomorrow and remind students that in this community we support on another.
 - Remind student that having a growth mindset tomorrow will help if they are nervous.

- Whale Shark Q & A
 - I would also like you to write 1-2 questions you have about whale sharks. **(SLIDE)**
 - (Hand each student another half sheet of paper to write down a question.)
 - When you have written your questions down, crumple paper into a ball.
 - (Collect papers in a bin.)

Whale Shark Intro

- Read aloud and answer questions from “question” bin.
 - Ask students if they know the answer before you do.

- Be sure to cover the following:
 - Whale sharks are the largest known fish and the largest shark (up to 30 feet long).
 - They are easily identified by their size and their white spots.
 - Filter feeders.
 - Filter feeding: swim with their mouth open (up to four feet wide) and suck plankton in using their gill rakers.
 - Plankton: any organism that can’t swim against the current; often microscopic
 - Whale sharks must travel large distances to get enough plankton to survive.
 - Bahía de los Angeles is one of a very few places where whale sharks can be predictably observed by humans because there is a reliable source of plankton.

- The shape of the bay, water temperatures, and wind patterns, create upwelling (water moving from the deep ocean up to the shallows) that bring plankton (organisms that can't swim against the current -generally tiny) to the surface.
- Whale sharks come here to eat that plankton.
- In order to make sure the whale sharks stay healthy, members of the community collect data about the whale shark population each year. **(SLIDE)**
 - Community members have been studying whale sharks in Bahía de los Àngeles since 2008.
 - Community Science: is scientific research and monitoring done by local communities.
 - Tomorrow we will be working with Vanessa Vasquez to see how the community collects this data.
 - Vanessa Vasquez grew up in Bahía de los Àngeles. **(SLIDE)**
 - She has a Masters in Marine Biotechnology.
 - She has studied horn sharks and has been studying whale sharks for years.
 - Vanessa will tell us more about, the research she does and her experiences working with whale sharks.
- Safety when snorkeling with whale sharks **(SLIDE)**
 - This day everyone will be 1:1 (adult: student) in the water.
 - Listen carefully to guide and boat drivers.
 - Things will happen quickly so you want to be ready.

Notebook Prep:

- Prep Science Notebooks **(SLIDE)**:

Science Notebook

Field Research: Whale Sharks		Investigate
Explore & Wonder		What types of evidence did we collect?
Observations	Questions	Is this an observational study or controlled experiment?
		<hr/> Make a Difference
		How could this research be used to make a difference?

Clean-up

- Review clean-up procedure from yesterday.
- Dismiss students as they are done.

Day 5: Whale Sharks Implementation Agenda

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Field Research	Team Leads
12:25 pm	Return to Field Station - Check student medication back into first aid station	Team Leads
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence -or- Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Siesta	PM Lead 1
2:30 pm	Salud	PM Lead 2
4:00 pm	Know it! Own it!	Field Research Manager & Team Lead 1
6:30 pm	Dinner	Program Manager
7:05 pm	Servant Leadership	PM Lead 1
7:35 pm	Exercise	PM Lead 2
8:30 pm	Sleep Prep	PM Lead 1
9:00 pm	Bedtime	PM Lead 1

Community Building

Day 5

Timing:

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- Frame w/ photos (1/mentor)
- Mentor thank you cards (1 pile/mentor)
- Thank-You Speech card (pre-filled out)

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).
- Give each student doing a thank you presentation their “Thank-You Speech” card.

Food & Conversation

Question: Describe the first time you stayed overnight somewhere without your family. What was it like?

Review Community Question:

- (Read today’s question out loud.)

Community Building Activity: Personal Thank You Presentations

Overview: Students will do personal thank you presentations for departing mentors.

Activity:

- Have students give their “Thank You Speech” and present each mentor with their framed picture and thank you cards.
- Before students go up remind them to speak in a strong voice and pause before they start and make sure they are taking up space.

Morning Announcements

- Review daily schedule and any boat/snorkel groupings.
- Review gear for the day:
 - Wear: a swimsuit, water shoes or closed-toed shoes, hat, sunglasses, short/long sleeves.
 - Backpack: Science notebook and pencil, towel (optional)
 - Fill and bring a water bottle.
 - Snorkel gear & wetsuit
 - Apply sunscreen.

- Ask Facilities Manager if they have any updates to share.
- High-five Tunnel for departing mentors.

Field Research
Whale Shark Monitoring

Overview

Research Contact: Vanessa Vazquez (Masters in Marine Biotechnology)(Bahía de los Àngeles)

Research Location(s):

- The Bay (specific area chosen by Vanessa)

Supplies:

- All Supplies on **General Field Research Supplies Check List** (see above)
- Field Research Protocol: Whale Shark Monitoring PowerPoint (for lecture portion)
- Clipboard (1/boat)
- Pencils
- GPS (6)

Logistics:

- One researcher per pair of boats.
 - o The pair of boat will stay together.
 - o The researcher starts on one boat and moves to the other boat approximately half way through.
- An additional staff member will be needed to lead Boats 1 & 2.
 - o This will need to be one of the boats with less than six people assigned otherwise a mentor will need to stay behind.
- All boats are allowed to have a guide plus the passengers, therefore it is ok to have the community researcher come onboard as they are acting as a guide.

Timing:

Time	Activity/Location	Breakdown
7:15 – 9:00AM	Prep & Transportation: Field Station	7:15 – 7:25AM: Students Prep for Field 7:30 – 8:20AM: Intro to Project by Vanessa 8:20 – 8:30AM: Gear Check 8:30 – 8:50AM: Drive to Research Location 8:50 – 9:00AM: Park, Unload & Final Gear Check
9:00 – 12:00PM	Field Research: Field	9:00 – 11:45: Whale Shark Research 11:45 – 12:00 PM: Return to Shore* *take photo of researcher data sheets.
12:00 – 12:25PM	Return to Field Station	12:00 – 12:15: Unload & drive back to field station 12:15 – 12:25PM: Unload & Rinse Gear

Overview of Research (Instructors Only):

- Whale sharks gather in the waters off of Bahía de los Ángeles because the Bay is considered one of the most biologically productive areas in the Gulf of California. The morphology of the bay, localized upwelling, wind patterns, and temperature of the water make it the perfect habitat for whale sharks to congregate seasonally for feeding.
- Whale sharks have been studied in Bahía de los Ángeles for many years. Community members have been involved in collecting data since 2008 and even earlier more informally, this is called community science. Based on some of this work by the community, a set of rules has been created called the “Code of Conduct” for safe interactions with whale sharks.
- Different types of data have been collected over time, including ways of feeding, composition of diet, and population information (identification of individuals, population numbers, males vs. females, size, tracking, etc.).
- This past year (2021) Vanessa and her team were able to collect biological samples and satellite tag two whale sharks. Satellite tags can last up to three years so will be very important in understanding the life cycle and yearly movement patterns of whale sharks. This is the first-time whale sharks have been satellite tagged in the Pacific Ocean! Prior to this it had only been done in the Caribbean.
- This research is important because whale sharks are an endangered species and much of their life history is unknown. This research is also important to the community because tourism focused on whale sharks to this area has increased tremendously, and therefore the need to manage the industry has also increased. It is now more important than ever, that scientists understand the population make-up and overall health of the whale sharks that migrate into the bay each year (June-December) so that the ecotourism industry can continue to prosper while whale sharks remain protected.
- Vanessa and her group share their data in several ways – they share their data with an online platform called Whalebook which is a worldwide database. They share their information with Comisión Nacional de Áreas Naturales Protegidas (CONAP) and report any illegal activity they might see. Additionally, they work with CONAP to offer a Whale Shark refresher course which is required by the government for all captains and guides who work with whale sharks. They share information with locals (who are often part of the whale shark ecotourism industry or other local boat drivers) to share sightings and behaviors of whale sharks and let boat drivers know where to drive more slowly and keep an eye out for whale sharks.

Field Research

Intro to Project (By Vanessa)

- Vanessa (and partners) introduction and background.
- History of Whale Shark research in Bahía de los Angeles.
- Description of current Whale Shark research.
- Description of today's data collection methods.
- Spot pattern analysis + database.
- Rules for swimming with Whale Sharks.
 - Always 1 adult remains on the boat with non-swimmers.
 - 1 meter from body
 - 2 meters from tail
 - Up to four people on one side
 - Can't have people on both sides
 - 1 boat per whale shark

Drive to Whale Shark Research

- Whale Shark research group will depart for Whale Sharks.
- Load boats:
 - One researcher per pair of boats.
 - The pair of boat will stay together.
 - The researcher starts on one boat and moves to the other boat approximately half way through.
 - All boats are allowed to have a guide plus the passengers, therefore it is ok to have the community researcher come onboard as they are acting as a guide.

Whale Shark Research

- Swimming w/ Whale Sharks. (Priority)
 - Have students gear up on drive out.
 - Wetsuits on halfway.
 - Life vest (optional), mask, fins, and snorkel ready.
 - When whale sharks have been spotted have all students gear up and be ready to go.
 - Wetsuits fully on.
 - Life vest fully on (optional).
 - Anti-fog in masks & rinsed.
 - Masks & fins ready to go.
 - Allow researcher to get into the water and sex the shark and take photos of its spot patterns. (Researcher)
 - Students will go with adults 1:1 (adult:student) ratio when cued by the guide or boat driver.
- Data Collection (Secondary):
 - When the students have calmed down and everyone has had a chance (or a few chances) to swim with the whale sharks, try to have collect data.
 - Assign roles: (these can be rotated throughout the data collection time)
 - Data Recorder (1): Fills out data sheet
 - GPS Person (1): Operates GPS and provides information to data recorder

- Whale Shark Spotter and Watcher (1): always keep eyes on the whale shark
- Whale Shark Length Estimator (1): will estimate the size of the whale shark in relation to the boat
- Find out the length of the boat to estimate whale shark length later.
- Fill out the top of the data sheet (Data recorder).
- When a whale shark is sighted:
 - Follow all the rules and directions given by the researcher.
 - Point at whale shark and follow it. (Whale Shark Spotter and Watcher)
 - Take a GPS location and record that on the data sheet. (GPS Person)
 - Estimate length of whale shark using the boat. (Whale Shark Length Estimator)
- Repeat for additional whale sharks with students switching roles.

Self-Reflection Day 5

Supplies:

- Rules for Writing (1/student)

Rules for Writing

- Have students take turns reading the rules out loud.

Writing Prompt #1

- Today you were out in the water.
- Maybe you swam with whale sharks! Maybe you watched from the boat.
- You have swum and snorkeled many times now.

Writing

Imagine being underwater when you write from these prompts:

- When swimming, what I remember seeing around me is....[2 minutes]
- When underwater, what I remember hearing is....[2 minutes]
- When I am in the water this is what it feels like...[2 minutes]
- When I hold my breath, this is what I feel like inside...[2 minutes]
- When I am in the boat, this is what I smell...[2 minutes]
- These are all the things I have tasted today...[2 minutes]
- Most of all, I want to remember what I feel when...[2 minutes]

Share out

- Ask students to share their writing with the group.

Know it! Own it!

Day 5

Logistics

Supplies

- Laminated Index Cards with #1-25
- Whale Shark Matching (1/student)
- Tierra y Mar sticker (1/mentor)
- Vocabulary Stickers
 - Replicates
 - Evidence

Set Up

- On a piece of chart paper write:
 - Sea-level Rise
 - Fisheries
 - Whale Sharks
- Have half-sheets of paper ready for Research Preview (2/student).
- Ask mentors to stay after Know it! Own it! for five minutes so you can go over their roles during this portion of the program.

Timing

Time	Activity/Location	Breakdown
20 Minutes	Mentor Introductions	4:00 – 4:10 Mentor Introductions 4:10 – 4:20 Getting to Know Each Other
25 minutes	Analyze & Make a Difference	4:20 – 4:30 Analyze 4:30 – 4:35 Make a Difference
30 minutes	Science Discovery Process In-Depth	4:35 – 4:40 Preview Knowledge 4:40 – 4:50 Investigate: Gather Evidence & Replicates 4:50 – 5:05 Application of SDP
45 minutes	Paper Airplane Lab	5:05 – 5:10 Paper Airplane: Gather Evidence 5:10 – 5:30 Students Determine How to Gather Evidence 5:30 – 5:50 Gather Evidence
25 minutes	Study Skills	5:50 – 6:00 Concept Maps as a Study Tool 6:00 – 6:15 Study Time
10 minutes	Research Preview	6:15 – 6:20PM: Overview of Islas Research 6:20 – 6:25PM: Clean-up

Lesson

Mentor Introductions

Mentor Introductions

- Introduce new mentors.
 - They will be with us the next four days.
 - Remember to take this opportunity to build your network by getting to know someone new.
- Ask each mentor to introduce themselves and give a brief 2-minute description of their current career.
- Welcome mentors into the group by giving them each a Tierra Y Mar group sticker.

Getting to Know Each Other

- Activity: All Alike (**SLIDE**)
 - Each group has five minutes to figure out a trait that all team members share.
 - Example: We all hate cilantro.
 - Example: We all have grandmothers named Barbara.
 - Figure out as many as you can in the time you have.
- When time is up, have groups share out their common traits.

Analyze & Make a Difference

Analyze

- Analyze. (**SLIDE**)
- Investigation Design: Pair-Share (**SLIDE**)
 - Was this research an observational study or a controlled experiment? How do you know?
- Pair-Share
 - Look over other research we have done: observational study or controlled experiment?
 - Sea-level Rise
 - Fisheries
 - Write these on the chart paper next to the experiments as they are determined.
- Data
 - What data did Vanessa and her team collect?
 - Photographs of the spot patterns on whale sharks.
 - Sex of the whale shark.
 - GPS location where whale shark was sighted.
 - What will Vanessa and her team do with the data they collected?

- The information will be submitted to an online database called “Sharkbook”
(SLIDE)
 - The photographs of the spot patterns on whale sharks are individual – meaning each whale shark has its own pattern, just like we have our own fingerprints.
 - The database uses AI software to look at the spot patterns and determine a set of best matches. **(SLIDE)**
 - Those best matches will be sent to Vanessa and her team to determine which picture is a best match.
 - That way science leaders can determine if this is a new whale shark they have never seen before or one they have observed before.
- **Whale Shark Matching (SLIDE)**
 - We will all have a chance to see what it is like to make a whale shark match.
 - Imagine you are a whale shark researcher.
 - You have been photographing whale sharks for your research and two of the whale sharks you photographed have come back with matches!
 - You will be given the original photo of the “unknown” Whale Shark and the four best matches the AI software came up with.
 - Your job is to select the best match!
 - Think-Group-Share
 - (Give each person a Whale Shark Match card.)
 - One unknown shark per side.
 - Unknown Whale Shark #1: Spotty
 - Unknown Whale Shark #2: Janiee

Make a Difference

- We will now consider how to Make a Difference **(SLIDE)**.
 - Whale sharks have recently been listed as endangered.
 - They are often killed for their highly valued meat, fins, and oil.
 - They are often bycatch, die by ship strikes, and face increasing pressure from ecotourism.
- Think-Pair-Share **(SLIDE)**:
 - How could this kind of information about whale sharks be used to make a difference?
- If time allows: Think-Pair-Share:
 - How did it feel to do this type of science? Do you think you would like to be a science leader like Vanessa? Why or why not?

Science Discovery Process In-Depth

Preview Knowledge

- Have students take out SDP Concept Map from their folder.

- Preview Knowledge. (**SLIDE**)
 - Ask students what they already know about the Science Discovery Process.

- Continuation of Investigate.
 - We are going to continue looking at the “Investigate” bubble. (**SLIDE**)
 - Today we will focus on “Gather Evidence”.
 - Have students:
 - Write “Gather Evidence” in Investigate bubble.
 - Think-Pair-Share: What do you think Gather Evidence means?

Investigate: Gather Evidence & Replicates

- Define Evidence: data that either supports or doesn’t support a hypothesis. (**SLIDE**)
 - Evidence is recorded. (**SLIDE**)
 - Data sheet, science notebook, computer spreadsheet, etc.
 - The way evidence will be collected must be clear and consistent
 - Clear:
 - Determine how measurements will be taken BEFORE you start the investigation.
 - Same measurement units (centimeters, kilograms, etc.)
 - How to take measurements (measure from soil to top of plant, etc.)
 - Consistent:
Take all measurements in the same way every time.

- Example: (**SLIDE**)
 - Observations: Plants that live in greenhouses seem very healthy and have lots of large flowers. I notice that people who work in greenhouses seem to water plants often.
 - Question: I wonder if a plant gets more water, will it have bigger flowers?
 - Hypothesis: If a plant gets more water, then it will have bigger flowers.
 - Investigation: Take two plants with no flowers and put them next to each other in a greenhouse.
 - Give plant #1: Gets 1 cup of water twice a day
 - Give plant #2: Gets 1 cup of water once a day

- Gather Evidence: Measure the two largest flowers on each plant, from the tip of one petal to the tip of the petal directly opposite in centimeters (to the nearest tenth of a centimeter).
- Replicates
 - Look at our experiment. Is there anything that concerns you as a science leader?
 - Issue: We only have one of each plant. Something else could have happened to Plant #2 (i.e., it had better light during part of the day, better air currents, etc.)
 - Another part of gathering evidence is determining how many replicates you want to do.
 - Replicates (**SLIDE**)
 - Define Replicates: an exact copy of an investigation.
 - Replicates are important because they reduce experimental error and increase confidence that your evidence is sound.
 - Look at our experiment again (**SLIDE**)
 - How many replicates are we doing?
 - (Watch out for students thinking the number of replicates is 6.)
 - Experiment #2
 - Hypothesis: If I add cheese to then end of a maze, then mice will find the end of the maze faster.
 - Investigation: Take two mice.
 - For mouse #1 place cheese at the end.
 - For mouse #2 place no cheese at the end.
 - Gather Evidence: Time how long it takes each mouse to reach the end of the maze in seconds (to the one hundredth of a second). Repeat this same investigation four more times.
 - How many replicates are we doing?
- Hand out Evidence and Replicate vocabulary stickers.
 - Have students add these to their SDP Concept Map next to “Investigate Bubble”.

Application of Science Discovery Process:

- Overview (**SLIDE**)
 - It’s time to apply this new knowledge.
 - You will return to the poster you worked on two days ago to look at the experiment you designed and determine how you will gather your evidence.
 - For gathering evidence be sure you are:
 - Clear and consistent in how to collect data.
 - Choosing a number of replicates
 - Once your group designed an experiment you will need to elect one person to be the presenter for your group.

- The presenter will share with the whole group:
 - Hypothesis
 - Investigation
 - How you will gather evidence
 - The presenter cannot have presented before.
 - When presenting today we will focus on using a “strong voice” and “taking up space”.
 - Standing with legs slightly apart and back straight.
 - Eyes on the audience.
 - When you have designed your experiment and have selected your presenter – help them practice presenting with a strong voice and taking up space.
- Application Activity
 - Example #1:
 - Observations: Some of the plants in my mom’s garden are short and some are tall. My mom puts fertilizer on some of her plants but I’m not sure which ones.
 - Question: I wonder if fertilizer can affect how tall it will grow?
 - Hypothesis:
 - Investigation:
 - Evidence
 - Clear and consistent:
 - Replicates:
 - Example #2:
 - Observations: Sometimes I study for tests and sometimes I don’t. My grades are different in every subject.
 - Question: Does studying effect my grades?
 - Hypothesis:
 - Investigation:
 - Evidence
 - Clear and consistent:
 - Replicates:
 - Example #3:
 - Observations: Sometimes water shot out of a water gun goes further than other times. People shoot water out of their water guns at different angles.
 - Question: I wonder if the angle of the water gun effects how far the water will go?
 - Hypothesis:
 - Investigation:
 - Evidence
 - Clear and consistent:

- Replicates:
 - Example #4:
 - Observations: I fed my new fish Food A the first month I had them, then I fed them Food B the second month I had them. I think they are getting bigger faster now.
 - Question: Does Food A or Food B help fish grow faster?
 - Hypothesis:
 - Investigation:
 - Evidence
 - Clear and consistent:
 - Replicates:
- Debrief
 - Have each group present.
 - Focus on having the presenter use a strong voice – have them start over if necessary.

Paper Airplane Lab

Paper Airplane: Gather Evidence

- Ask student: Is your paper airplane investigation is an experiment or observation. **(SLIDE)**

- Gathering evidence.
 - It's time to apply our new knowledge about gathering evidence to our own investigations.
 - You and your partners will determine how to collect evidence based on the investigation you have designed.
 - You will write a description of how you want your evidence collected.
 - Remember that evidence collection needs to be clear and consistent.
 - Show example description. **(SLIDE)**
 - Hypothesis: If a paper airplane is longer then, it will fly further.
 - Investigation: We will build a paper airplane that is 11 inches long from tip to tail and a paper airplane that is 9 inches long from tip to tail.
 - Gather Evidence: We will stand at one end of the testing zone and throw both planes with the same hand and the same amount of force. We will measure the distance to the planes from the front of the foot of the person who threw the plane to the front tip of the airplane in inches.
 - Replicates: 6
 - You will also need to determine the number of replicates you want for your investigation.
 - The more replicates the less experimental error and the more confidence you will have in your data – however the number of replicates must be reasonable to collect in the time you have.

- Once your plan for gathering evidence is approved by a Team Lead it must be recorded in your science notebook by everyone in your group. **(SLIDE)**
 - Have students open their notebook to the Paper Airplane section and go to next blank page.
 - Page header "Gathering Evidence".

Students Determine How to Gather Evidence & Replicates

- Check in with each group while they work.
- Once approved have ALL students record how they will gather evidence in their notebook.
 - Then all groups should work on creating their control and experimental paper airplanes for their investigation (if not already done).
 - Students can also work on creating a datasheet to best collect their data if they have extra time.

Gather Evidence

- Now it is time to run your investigation and gather evidence.
- Evidence Collection:
 - Remember that evidence collection needs to be clear and consistent.
 - Remember to record all evidence in your science notebook.
 - You pick and choose the data to record, even if you don't like what the data looks like!
 - Sometimes we get unexpected data and that's okay. As science leaders it is important to follow through with your investigation without changes, because we may learn something unexpected and that is just as important as proving a hypothesis correct.
- Review expectations for investigation:
 - Be respectful:
 - All scientists need to collect data, so take turns.
 - Do not cross the runway when other scientists are gathering evidence.
 - Be curious:
 - Ask other scientists about the investigation they are doing and the data they are collecting – by talking to other scientists you can often get great ideas for your own investigation!
 - Be safe:
 - Do not throw a paper airplane if someone is on the runway collecting their paper airplane.
 - Collecting evidence:
 - You and your team will approach the runway with your experimental and your control planes. You will:
 - Show the team lead your science notebook where you will be recording your evidence.
 - Throw each plane, remember be consistent – how are you holding the plane each time, how much force are you using, etc.
 - Record your evidence.
 - Pick up your planes and move to the back of the runway line.
 - Repeat this until you have all the replicates you decided on.

Students Run Investigation & Collect Evidence

- If students finish early encourage them to Be Curious! and watch the other scientists at work.
- (If there is not enough time for all students to collect all their evidence assure them that they can finish the next day.)

Study Hall

Concept Maps as a Study Tool

- Review concept maps are a tool. **(SLIDE)**
 - We have been working on our concept maps each day because one of the best ways to identify relationships between ideas and link them together.
 - Science tells us that understanding these relationships and making a visual representation of those connections can help you understand things at a much deeper level and make it easier for you to remember and retrieve the knowledge later.
- How to study with a Concept Map. **(SLIDE)**
 - Take time to look over your concept map – try to remember your main ideas and the connections between ideas.
 - Cover up a bubble with your hand and see if you can remember what was in the bubble and the ideas connected to that bubble.
 - Turn your concept map over at some point and try to visualize it in your mind. What parts of it do you remember?
 - Spend more time looking over the sections you don't remember.
 - Finally, try taking a blank concept map and fill it in with what you remember.
 - Then take your concept map and compare it to the original to see what you remembered and what you don't.

Study Time

- Give students time to study their concept maps independently.
 - Remind students that science tells us we should be focused during this short study time.
- Test Concept Map Knowledge: **(SLIDE)**
 - Give each student a blank "Science Discovery Process Concept Map" and let them try to fill in as much of it as they can remember.
 - Remind students they may not be able to fill in all Science Discovery Process bubbles yet – we are building up to this.
 - Focus on: Make a Difference, Explore and Wonder, and Investigate bubbles.
 - (Turn Science Discovery Process poster around so it can't be seen.)
 - Give students ~ 5 minutes to fill out as much of the concept map as they can.
 - Once time is up have them compare the concept map they filled out with their actual concept map.

Research Preview

Clean-up

- Review clean-up procedure from yesterday.
- Dismiss students as they are done.
- **Remind mentors to hang back after Know it! Own it!**
 - Review mentor roles for Know it! Own it! portion of the day.
 - (See Know it! Own it! Overview in curriculum for ideas.)

**Day 6: Islas
Implementation Agenda**

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Field Research <ul style="list-style-type: none"> • Take photos of data sheets. 	Team Leads
12:25 pm	Return to Field Station <ul style="list-style-type: none"> - Check student medication back into first aid station 	Team Leads
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence -or- Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Siesta	PM Lead 1
2:30 pm	Salud	PM Lead 2
4:00 pm	Know it! Own it! <ul style="list-style-type: none"> • 5:30 – 6:00PM Intro to Sea Turtle Research by Grupo Tortuguero 	Field Research Manager & Team Lead 2
6:30 pm	Dinner	Program Manager
7:05 pm	Servant Leadership	PM Lead 1
7:35 pm	Exercise	PM Lead 2
8:30 pm	Sleep Prep	PM Lead 1
9:00 pm	Bedtime	PM Lead 2

Community Building

Day 6

Timing:

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- iPod w/ preloaded music
- Speaker

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).
- Prep supplies for Community Building Activity.

Food & Conversation

Question: Who would you want to bring to Bahia and what would you want to show them?

Review Community Question:

- (Read today's question out loud.)

Community Building Activity: Curiosity Questions – College

Overview: This activity is meant to break the ice and let people get to know each other.

Review purpose and expectations:

- Today's activity is: Curiosity Questions.
 - When music plays walk around and mingle.
 - When the music stops partner with the person closest to you.
 - A question will be read.
 - Introduce yourselves and answer the question.
 - If time remains you can discuss the question from breakfast or anything else, you would like to talk about.
 - When the music starts again, thank your partner, and begin mingling again.
 - The next time the music stops you must find a NEW partner.
 - We will repeat this several times.

Activity:

- Start music and allow people to mingle.
- After ~10-20 seconds stop the music and read a question from below.
- Allow pairs 1-2 minutes to talk, then begin the music again.
- Curiosity Questions – College
 - What do you think would be exciting about college?

- What do you think would be challenging about college?
- Would you rather live on campus or at home? Why?
- Would you rather go to large college or a small college? Why?
- How prepared do you think you will be for college after you graduate high school?
- What is one major you have considered in the past or are considering? Why are you interested in that major?
- If you struggle with academics in college, what will you do?

Debrief:

- Potential questions:
 - What is one thing you learned about another person today?
 - What is something you learned you have in common with another person?

Morning Announcements:

- Review daily schedule and any boat/snorkel groupings.
- Review gear for the day:
 - Wear: a swimsuit, water shoes or closed-toed shoes, hat, sunglasses, short/long sleeves.
 - Backpack: Science notebook and pencil, towel (optional)
 - Fill and bring a water bottle.
 - Snorkel gear & wetsuit
 - Apply sunscreen.
- Ask Facilities Manager if they have any updates to share.

Field Research

Overview

Research Contacts: Isamo Suzuki (lead), Arely Ocaña, Ximena Diaz, Martin Diaz, Yoseline Fuerte, Eva Fuerte, Carlos Fuerte, Yajaira Torres, Chrystal Meza, Elena "Nena" Estrada, Maru Ramirez, Kenia Tarin

Locations:

Monitor 5 locations in the following order:

- o Gemelito 1
- o Gemelito 2
- o Cabeza de Caballo
- o Calavera
- o Tijereta (the South end of Coronado)

Supplies:

- Field research:
 - o All Supplies on **General Field Research Supplies Check List** (see above)
 - o Clipboard (1/2 students)
 - o Islas Datasheet (Per Island) copied on Write in the Rain paper (3/2 students)
 - o Islas Datasheet (Per Trip) Copied on Write in the Rain Paper (1/2 students)
 - o Islas Research Protocol for Mentors (8)
 - o Binoculars (1/2 students)
 - o Counters (1/student)*

*Islas group will provide (3) more

Timing:

Time	Activity/Location	Breakdown
7:15 – 8:00AM	Prep & Transportation: Field Station	7:15 – 7:25AM: Students Prep for Field 7:25 – 7:35AM: Gear Check 7:35 – 7:50AM: Drive to Boat Ramp 7:50 – 8:00AM: Park, Unload & Final Gear Check
8:00 – 10:20PM	Field Research: Field	8:00 – 8:10AM: Introductions (on boats) 8:10 – 8:20AM: Research Overview 8:20 – 10:20AM: Collect Data
10:20 – 12:00PM	Field Trip: Field	10:20 – 10:45: Transfer to Mitlan 10:45 – 11:30: Snorkel Mitlan 11:30 – 11:40: Clean-up & Load boats 11:40 – 12:00: Drive back to boat ramp
12:00 – 12:25PM	Return to Field Station	12:00 – 12:15PM Drive back to field station 12:15 – 12:25PM Unload & Rinse Gear

Overview of Research (Instructors Only):

This project is brand-new so there aren't many details at this time. This research group was started in 2020 and consists of 3 men (who are mainly the boat guides) and 6 women (who do more with data collection). Three of them travel by boat to monitor the islands and each group goes approximately once a week during Jun-October (funding dependent).

They are supported by CONAP. The data collected is used by CONAP to make management decisions. At the five research locations above, they monitor tourism, fishing, bird life, mammals, and anything else of note.

Field Research

Loading boats

- Make sure all students are aware of their new boat assignment.

Introductions (on boats)

- Have each person take a turn and introduce themselves and say their name and their favorite food in Spanish and English (Ocean Discovery staff and students).

Research Overview

- Done by Islas researchers.
 - o Overview of research, importance of research, etc.

Data Collection

- From the boat we will observe the birds and collect data on species and numbers (using a counter).
 - o For each bird students will record:
 - Scientific name
 - Common name
 - The number they see
 - What activity the bird is doing.
- Researchers will also take photos.

Self-Reflection Day 6

Supplies:

- Rules for Writing (1/student)

Rules for Writing

- Have students take turns reading the rules out loud.

Writing Prompt #1

- Dancing at dusk, nighttime snorkel, under the stars sleeping, what a difference a night makes!
- What a difference you are making in the environment, the world, your community.
- Using all five senses, see, hear, smell, taste, touch, about these prompts.

Writing

- **Prompt 1:** Let me tell you about what it's like when the sun goes down here in Bahia... [3 mins]
- **Prompt 2:** This is what I want you to know most of all about the nighttime... [3 mins]
- **Prompt 3:** This is how I am making a difference... [5 mins]
- **Prompt 4:** This is what this experience in Bahia means to me... [5 mins]

Pair-Share

- Pair students up let them choose responses to TWO prompts to share with each other.

Share out

- Ask students to share their writing with the group.

Know it! Own it!

Day 6

Logistics

Supplies

- Laminated Index Cards with #1-25
- Application of Science Discovery Process - Day 6 (1/3 students)
- Vocabulary Stickers (1/student)
 - Examine Results
 - Summarize Data
 - Trend
 - Outlier
 - Wetlands
- Wetlands Hypothesis Stickers (1/student)

Set Up

- N/A

Timing

Time	Activity/Location	Breakdown
20 minutes	Analyze & Make a Difference	4:00 – 4:20 Analyze & Make a Difference
40 minutes	Science Discovery Process In-Depth	4:20 – 4:25 Preview Knowledge 4:25 – 4:40 Analyze: Examine Results, Trends, and Outliers 4:40 – 5:00 Application of SDP
30 minutes	Paper Airplane Lab	5:00 – 5:05 Examine Results, Trends & Outliers 5:05 – 5:30 Students Examine Results
25 minutes	Research Preview - Wetlands	5:30 – 5:45 Wetlands Overview 5:45 – 5:50 Notebook Prep
30 minutes	Research Preview – Sea Turtles	5:50 – 6:20 Lecture by Grupo Tortuguero* 6:20 – 6:25 Clean-up *Confirm if students will be able to get onto boats to check nets. **Confirm if students will be able to fill out data-sheets (ours) along-side volunteers.

Lesson

Analyze & Make a Difference

- TBD based on Research
- Focus on gathering evidence.
 - Clear and concise.
 - Replicates.

Make a Difference

- TBD based on Research

Science Discovery Process In-Depth

Preview Knowledge

- Have students take out SDP Concept Map from their folder.

- Preview Knowledge. **(SLIDE)**
 - Ask students what they already know about the Science Discovery Process.
 - Science Discovery Process – Analyze. **(SLIDE)**
 - Focus on “Examine Results & Trends and Outliers”.

- Begin Analyze **(SLIDE)**.
 - Today we will focus on “Examine Results and Summarize Data”.
 - Have students:
 - Write “Analyze” in Analyze bubble.
 - Have students write “Examine Results” and “Summarize Data” in Analyze bubble.
 - Think-Pair-Share: What do you think Examine Results means?

Analyze: Examine Results & Trends and Outliers

- Define Examine Results: Looking over gathered evidence. **(SLIDE)**
 - Once scientists have run their investigation it is time to start analyzing the evidence they gathered to determine if the evidence supports or doesn’t support the hypothesis.
 - There can be a lot of evidence which can sometimes feel overwhelming or confusing so science leaders often Summarize Data to make it easier to interpret. **(SLIDE)**

- Define Summarize Data: presenting data in a meaningful and informative way. **(SLIDE)**
 - Science leaders use things such as tables, graphs, and statistics to help them organize and interpret their data in a meaningful way.
 - Example:
 - Hypothesis: If I measure the boys and girls in Ms. Smith’s class, then boys will be taller than the girls.
 - Examine Results (on slide)
 - Can you tell simply by looking at the data?
 - Can be difficult.
 - This is where summarizing data using statistics such as taking an average could be helpful to figure out what the data is telling us.

- Define average: a number that represents a data set. **(SLIDE)**
 - An average is one type of statistic to summarize data.
 - Review finding the average of something: add all the values and then divide by the number of values.

- Get an average for the girls and the boys
 - (Have all students do this together using calculators.)
 - Boys: 57.11
 - Girls: 56.6
- How does an average help us examine the results?
- Trends & Outliers:
 - Another way we can examine results is by looking for trends or outliers in our data sets.
 - Define Trend: patterns in the data. (SLIDE)
 - Equate to social media.
 - When something is “trending” it’s because a lot of people are mentioning it on social media. Same with data – if a lot of your results are starting to fall into certain patterns or common numbers, that’s what we call a trend.
 - Example (SLIDE):
 - Hypothesis: If a plant gets more water, then it will have bigger flowers.
 - Investigation: Take two plants with no flowers and put them next to each other in a greenhouse.
 - Give plant #1: Gets 1 cup of water twice a day
 - Give plant #2: Gets 1 cup of water once a day
 - Measure the two largest flowers on each plant, from the tip of one petal to the tip of the petal directly opposite in centimeters (to the nearest tenth of a centimeter).

▪ Evidence

Plant	Flower Size	Flower Size
	Day 1	Day 30
1	10cm	15.3cm
2	10cm	16.6cm
3	10cm	15.2cm
4	10cm	12.1cm
5	10cm	13.3cm
6	10cm	11.8cm

- Questions for students:
 - What trends in the evidence do you see?
 - Would summarizing the data help?
- Define Outlier: a data point that falls outside the normal range.
 - Should you remove outliers from your data set? – No.
 - They are part of the data collected and should not be removed.

- Outliers can often be very interesting and it can be worth trying to figure out why they may have occurred.
- Example (**SLIDE**):
 - Hypothesis: If a plant gets more water, then it will have bigger flowers.
 - Investigation: Take two plants with no flowers and put them next to each other in a greenhouse.
 - Give plant #1: Gets 1 cup of water twice a day
 - Give plant #2: Gets 1 cup of water once a day
 - Measure the two largest flowers on each plant, from the tip of one petal to the tip of the petal directly opposite in centimeters (to the nearest tenth of a centimeter).

- Evidence:

Plant	Flower Size Day 1	Flower Size Day 30
1	10cm	15.3cm
2	10cm	28.2cm
3	10cm	15.2cm
4	10cm	12.1cm
5	10cm	13.3cm
6	10cm	11.8cm

- Questions for students:
 - Do you see any outliers? Plant #3
 - What could have happened?
 - Possibly a bird was coming over and pooping in this plant on a regular basis providing it with additional nutrients.
- Have students:
 - Have students write “Discovering Trends and Outliers” in Analyze bubble.
- Hand out Examine Results, Summarize Data, Trend, and Outlier vocabulary stickers.
 - Have students add these to their SDP Concept Map next to “Analyze Bubble”.

Application of Science Discovery Process

- Each group will be given two example investigations to look over. (**SLIDE**)
 - Your goal is to look examine the evidence, find any trends, identify any outliers, and decide if the evidence supports or doesn’t support the hypothesis.
- Give groups time to work on both problems.

- Come back together to review responses.
 - Example #1 (SLIDE):
 - Hypothesis: If I create a greater angle to the floor with my water gun then, the water will shoot further.
 - Investigation: Take 14 of the same water guns and fill them with 30mL of water. With two of the water guns, create an angle of 15° to the floor, hold the trigger for 3 seconds, and measure the distance of the water in inches. With two of the water guns, create an angle of 30° to the floor and shoot the water. Continue with two guns for 45°, 60°, 75°, 90°, and 0° angles with the floor. Pull the water gun trigger for three seconds and measure the distance in inches the furthest droplet of water goes.
 - Gathered Evidence:

Water Gun Degrees from Ground	Water Gun #1 Distance of Water (inches)	Water Gun #2 Distance of Water (inches)	Avg Distance of Water (NOT PROVIDED)
0°	30	32	31
15°	34	35	34.5
30°	38	37	37.5
45°	45	43	44
60°	41	40	40.5
75°	37	37	37
90°	30	31	30.5

- Questions:
 - Trends:
 - What trends do you see?
 - Did you summarize the data? How?
 - Outlier:
 - Do you think any of these is an outlier? Why do you think that?
 - Hypothesis:
 - Does the evidence support or not support the hypothesis?
- Example #2 (SLIDE):
 - Hypothesis: If I feed fish, Fish Food A then they will grow faster?
 - Investigation: A scientist takes 10 fish that are all four centimeters long when measured from mouth to the fork of their tail. All of the fish are kept in the same tank. Half the fish are fed 2 oz of Food A twice a day, the other half are fed 2 oz of Food B twice a day at the same time. All fish were measured again after three months.

▪ Evidence:

Fish	Fish Food	Length at 3 mos.
1	A	6 cm
2	A	9 cm
3	A	5 cm
4	A	6 cm
5	A	7 cm
6	B	12 cm
7	B	14 cm
8	B	10 cm
9	B	2 cm
10	B	15 cm

- Trends?
 - Did you summarize data? How?
- Outliers?
 - Possible explanation?
- Hypothesis?
 - Does the data support/not support the hypothesis?

Paper Airplane Lab

Examine Results, Trends & Outliers: (SLIDE)

- Complete gathering evidence if you didn't finish yesterday.
- Examine evidence.
 - Consider if summarizing data will help.
- Look for trends and record them using full sentences in your notebook.
- Look for and identify outliers in your data, record if you have any or none.
 - If you find an outlier – try to remember if anything occurred during that trial.

Students Examine Results:

- As students work, walk around to each pair, and be sure they are able to take averages and find trends and outliers.
 - (If one group finishes early have them copy their data to the white board so that the group can discuss their data using the same questions.)

Share Results, Trends, and Outliers (if time allows)

- Review the data set on the board.
 - Ask other students to find trends and outliers.

Preview Research - Wetlands

Wetlands Overview

- Tomorrow morning, we will be doing research in the wetlands.
- Define Wetlands. (SLIDE)
 - o Wetlands are areas of land that are wet and sometimes covered with water.
- Wetlands serve many important functions. (SLIDE)
 - o Wildlife housing
 - o Stops for migratory birds
 - o Water and Air purification
 - o Erosion prevention
 - o Flood control
- Review past Ocean Discovery research.
 - o No previous studies on wetlands in Bahía de los Àngeles had ever been conducted before Ocean Discovery began in 2004. (SLIDE)
 - o The work Ocean Discovery students did to monitor five of the local wetlands (El Rincon, Coronado, Punta Arena, La Gringa, and Las Animas) helped in designating the area a Biosphere Reserve in 2007. (SLIDE)
- Punta Arena. (SLIDE)
 - o The wetland we will be studying, Punta Arena, is mostly formed by saltwater from the tides.
 - o Due to small changes in elevation, some areas of the wetland are more wet (lowlands) and some are drier (uplands).
 - o Today we will collect data to see if these changes in elevation create a change in plants and animals.
- Introduce Hypotheses. (SLIDE)
 - o **If** changes in elevation impact plants, **then** there will be a change in the types and amounts of plants as we survey from the uplands to the lowlands.
 - o **If** changes in elevation impact animals, **then** there will be a change in the types and amounts of animals as we survey from the uplands to the lowlands.
- Gather Evidence (SLIDE)
 - o To inform this hypothesis, we will gather evidence on:
 - 1) The amount and types of plants in the uplands and the lowlands
 - 2) The amount and types of animals in the uplands and the lowlands
 - o Collection Methods

- Plants (**SLIDE**)
 - Quadrats & Percent coverage
 - Examples (**SLIDES**)
 - Animals (**SLIDE**)
 - #'s of horn snails, fiddler crabs, etc.
 - Example (**SLIDE**)
- Review data sheet. (**SLIDE**)

Notebook Prep:

- Prep Science Notebooks. (**SLIDE**)
- Hand out Hypothesis Stickers.
 - Have students place in science notebook.
- Hand out vocabulary stickers for student to place in notebook under Vocabulary:
 - Wetlands

Science Notebook

<p>Field Research: Wetlands</p> <p>Explore & Wonder</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black; border-right: 1px solid black; padding: 5px;">Observations</td> <td style="width: 50%; border-bottom: 1px solid black; padding: 5px;">Questions</td> </tr> <tr> <td style="border-right: 1px solid black; height: 300px;"></td> <td style="height: 300px;"></td> </tr> </table>	Observations	Questions			<p style="text-align: center;">Investigate</p> <p>Hypothesis:</p> <p>Replicates:</p> <p>Accept or Reject Hypothesis:</p> <p style="text-align: center;">Vocabulary</p> <hr style="width: 80%; margin: auto;"/>
Observations	Questions				

Preview Research – Sea Turtles

**This introduction will be done by someone from Grupo Tortuguero.*

To cover:

- Overview of Grupo Tortugero and their work.
- Biology of sea turtles and endangered species status.
- Student Q & A

Clean-up

- Review clean-up procedure from yesterday.
- Dismiss students as they are done.

Day 7: Wetlands & Sea-Turtles Implementation Agenda

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Field Research	Team Leads
12:25 pm	Return to Field Station - Check student medication back into first aid station	Team Leads
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence -or- Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Chores	PM Lead 1
2:10 pm	Prep for Field: Sea Turtle Monitoring - Pack "to-go" dinners - Students get field ready o Wear bathing suits and water shoes. o Bring headlamp or flashlight and a towel.	Team Leads
2:25 pm	Field Research: Sea Turtle Monitoring	Team Leads
8:45 pm	Return to Field Station (potentially) - Check student medication back into first aid station	Team Leads
9:00 pm	Sleep prep (adjust according to return time)	PM Lead 1
9:30 pm	Bedtime (adjust according to return time)	PM Lead 1

Community Building

Day 7

Timing:

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- Small orange cones (2)

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).
- Prep supplies for Community Building Activity.
 - Set up small orange cones to create an invisible line students can cross.

Food & Conversation

Question: What do you think will be the most fun part of college?

Review Community Question:

- (Read today's question out loud.)

Community Building Activity: Would You Rather?

Overview: This is a game to help students see there are many similarities and differences between themselves, other Ocean Leaders, staff, and mentors.

Introduction:

- While there are things we have in common with the people around us and things that make us unique we are all still part of the community of scientists around the world.
- This activity is an opportunity to see the things we have in common and things that make us different from our Ocean Discovery Family members.
- Later today you might want to continue to build your network by asking people about their responses to today's Would You Rather questions.
- Expectations:
 - We will all start out on in a single line between the orange cones.
 - I will read a question out loud. Depending on your answer you will walk to one side or the other.
 - After everyone has chosen a side, I will have you pair up with someone on the same side to discuss your reasoning and then we will have a couple of people share out their responses.
 - Example:
 - Would you rather watch TV /or/ go to the movies?
 - If you would rather watch TV stand on this side of the orange cones (motion to one side).

- If you would rather go the movies stand on this side of the orange cones (motion to the opposite side.)

Activity:

- Potential questions:
 - Would you rather get up early /or/ sleep late?
 - Would you rather eat breakfast every meal /or/ dinner for every meal?
 - Would you rather eat pizza /or/ tacos for the rest of your life?
 - Would you rather have a nose the size of Pinocchio /or/ ears as large as Dumbo's?
 - Would you rather be able to talk with animals /or/ hear other people's thoughts?
 - Would you rather be president of the United States /or/ a movie star?
 - Would you rather be able to breathe under water /or/ fly through the air?
 - Would you rather be able to stop time /or/ go back in time?
 - Would you rather have five good friends /or/ one best friend?
 - Would you rather be the best player on a losing team /or/ the worst player on a winning team?

Morning Announcements:

- Review daily schedule and any boat/snorkel groupings.
- Review gear for the day:
 - Wear: a swimsuit, water shoes or closed-toed shoes, hat, sunglasses, short/long sleeves.
 - Backpack: Science notebook and pencil, towel (optional)
 - Fill and bring a water bottle.
 - Apply sunscreen.
- Ask Facilities Manager if they have any updates to share.

Field Research
Wetlands

Overview

Research Contact: Lindsay Goodwin (Ocean Discovery Institute)

Research Location(s):

- Punta Arena

Supplies:

- All Supplies on **General Field Research Supplies Check List** (see above)
- Wetlands Field Research Protocol for Mentors (1/mentor)
- Wetlands Datasheet copied on Write in the Rain paper (1/group*)
 - o *Groups = mini research groups ~ 1 mentor + 2-3 students)
- Clipboards + pencils (1/group*)
- Thick long socks (1/student)
 - o To protect from scratch grasses in wetlands
- 100m transect tape (1/group*)
- 50cm x 50cm quadrat (w/ four quadrats within) (1/group*)
- Wetland ID Guide (1/group*)
- Beach fun supplies:
 - o Football
 - o Frisbee
 - o Soccer ball, etc.

Timing:

Time	Activity/Location	Breakdown
7:15 – 8:00AM	Prep & Transportation: Field Station	7:15 – 7:25AM: Students Prep for Field 7:25 – 7:35AM: Gear Check 7:35 – 7:50AM: Drive to Research Location 7:50 – 8:00AM: Park, Unload & Final Gear Check
8:00 – 10:00AM	Field Research: Field	8:00 – 8:30AM: Review Data Collection Methods 8:30 – 10:00AM: Collect Data
10:00 – 12:00PM	Field Trip: Field	10:00 – 11:40 Beach Fun @ Punta Arena 11:40 – 12:00PM: Clean-up, Load Vans & Depart
12:00 – 12:25PM	Return to Field Station	12:00 – 12:15PM: Drive to Field Station 12:15 – 12:25PM: Unload & Rinse Gear

Overview of Research (Instructors Only):

Wetlands are areas of land that are wet and inundated by water, at least sometimes. The wetlands we will be studying are mostly formed by the saltwater that the tides bring into low land areas. These wetlands have unique soil conditions that differ from land or sea and support plants adapted to wet conditions.

Wetlands provide many important functions which include wildlife housing, plant production or growth, stops for migratory birds, water treatments, air purification, erosion prevention, and flood control. These functions within the wetland help many species survive and avoid extinction. Wetland ecology helps to understand the natural world well enough to predict changes in the wetland. By knowing how wetlands will respond to future situation such as development, pollutants, or climate change we can protect them and therefore, all their functions.

Bahía de Los Angeles is a hot, arid region that is surrounded by a productive marine environment. The wetlands of Bahía de los Angeles are relatively pristine and they provide an example of what a healthy community looks like. The wetlands in BLA are unique because they have a mix of more temperate salt marsh species and tropical salt marsh species primarily red mangrove. Salt marshes in BLA occur within the intertidal zone in areas with low wave energy. They have soft substrates (mud or fine sand) and may support plants, such as mangroves or marsh succulents, or may be unvegetated (tidal flats). Ecosystems, including tidal wetlands, have undergone great change in short periods of time. This change can be from natural causes such as changes in abiotic properties like storm events or biotic properties like plant succession and animal colonization.

No previous studies on wetlands in BLA had ever been conducted before Ocean Discovery began in 2004. Since 2004 monitoring efforts have taken place in five wetlands (El Rincon, Coronado, Punta Arena, La Gringa, and Las Animas). This work helped lead to the designation of the area as a Biosphere Reserve in 2017.

During this field research, students will collect data to see if the changes in elevation change the types of flora and fauna in the wetlands. They will collect data on types and amounts of flora and fauna along a transect which moves from the uplands to the lowlands.

Field Research

Drive to Research Location

- Parking area in Punta Arena near sign.

Overview of Wetlands

- Remind students that they will be collecting data to analyze back at the lab.
- Review hypothesis:
 - o If changes in elevation impact plants, **then** we should see a change in the types and amounts of plants as we survey from the uplands to the lowlands.
 - o If changes in elevation impact animals, **then** we should see a change in the types and amounts of animals as we survey from the uplands to the lowlands.
- (Point out the uplands and lowlands and where students will be running their transect.)

Review Data Collection Methods

- Demonstrate how to lay the quadrat.
 - o Capture and count anything moving quickly out of the quadrat (i.e., crabs).
- Demonstrate how to take % plant coverage measurements using a quadrat.*
 - o Show how each square is 25%.
 - o How much does each type of plant take up if you pushed them all into one corner?
 - o * Expect difficulties in students understanding % coverage.
 - If necessary, do multiple demonstrations by moving the quadrat to different locations before releasing students to practice.
- Demonstrate how to count epifauna.
 - o Push plants away to look around on the surface.
- Allow students to practice

Data Collection

- Each Field Research Group will be assigned a transect (see map below.)
 - o Transects do not need to be in a specific area just need to be spaced far enough apart so that the three transects do not intersect and each transect travels from the uplands toward the coast.
 - o Each Field Research Group will divide into three teams w/ one staff member with each team.
- Start in the uplands and lay a 100m transect along your general transect line.
 - o Place one quadrat at the below locations along your 100m transect:
 - 33m
 - 66m
 - 99m
 - o For each quadrat take the below plant measurements:
 - % cover *Batis maritima*
 - % cover *Distichlis spicata*
 - % cover *Sarcocornia pacifica*
 - % open space

- For each quadrat take the below epifauna measurements, be sure to move the plants aside gently to see the ground:
 - # of Horn snails (*Cerithidea mazatlanica*)
 - # of Fiddler Crabs + holes (*Uca crenulate*)
 - # of other crabs
 - # of other snails
- Pick up transect and lay it out for another 100m towards the waterline and repeat until the entire transect has been surveyed.

Field Trip

Beach Fun

- Set up umbrellas, snacks, towels, etc. near the sandy beach.
- Students can play games, use sports equipment, relax, etc.
- Staff should rotate lifeguarding duties every 20 minutes.
 - Person on lifeguard duty will signal to another staff member if an additional lifeguard is necessary (more than 8 students).

Wetland Transect Map



Wetlands Data Sheet

Names:	Date:
	Air Temp:

Measurement	50m	100m	150m	200m	250 m
PLANTS					
% cover <i>Batis maritima</i>					
% cover <i>Distichlis spicata</i>					
% cover <i>Sarcocornia pacifica</i>					
% open space					
ANIMALS					
# of Horn snails (<i>Cerithidea mazatlanica</i>)					
# of Fiddler Crabs + holes (<i>Leptuca crenulate</i>)					
# of other snails					
# of other crabs					

Measurement	300m	350m	400m	450m	500m
PLANTS					
% cover <i>Batis maritima</i>					
% cover <i>Distichlis spicata</i>					
% cover <i>Sarcocornia pacifica</i>					
% open space					
ANIMALS					
# of Horn snails (<i>Cerithidea mazatlanica</i>)					
# of Fiddler Crabs + holes (<i>Leptuca crenulate</i>)					
# of other snails					
# of other crabs					

Wetlands ID Guide



Sarcocornia pacifica



Batis maritima



Distichlis spicata



**Horn Snail
(Cerithidea mazatlanica)**



**Fiddler Crab
(Leptuca crenulate)**

Self-Reflection Day 7

Supplies:

- Rules for Writing (1/student)

Rules for Writing

- Have students take turns reading the rules out loud.

Writing Prompt #1

- You've been a scientist for a week in Bahia.
 - You've explored nature.
 - You have participated in several research projects to help make a difference.
 - You've swam in the gulf waters.
- You will go home with so much knowledge, so much experience.
- But like the tides, everyone's feelings ebb and flow—some days are exciting, some scary, some weird, some homesick, some beautiful.

Writing

Describe in detail what each of these feelings remind you of:

- **What is most exciting so far is...** [2 mins]
- **What was the weirdest part for me has been...** [2 mins]
- **The scariest is...** [2 mins]
- **When I feel most homesick is...** [2 mins]
- **The most challenging part for me has been...** [2 mins]
- **Who has surprised me the most is...** [2 mins]
- **What impresses me most is how I am able to...** [2 mins]

Pair-Share

- (If time allows) Pair students up so they can read their writing to each other.

Share out

- Ask students to share their writing with the group.

Field Research - Sea Turtles

Overview

Research Contact: Erika Santacruz Lopez (Grupo Tortuguero)

Research Location(s):

- La Gringa, Punta Arena, Glendale Field Station, South of Villa Bahia*
 - o *Specific area to be chosen by Erika close to day of research

Supplies:

**Check with Field Research Manager to determine if students will be eating dinner in the field or returning to field station for dinner.*

- All Supplies on **General Field Research Supplies Check List** (see above)
- Ocean Discovery Sea Turtle Morphometrics Datasheets (50)
- Clipboards + pencils (8)
- Latex Gloves
 - o Medium (1 box), Large (1 box), XL (1 box)
- Beach umbrellas (9)
- Water jugs (6)
- Crazy creeks (as many as we have)
- Lifejackets (3)
- Large map of Baja (1)
- To go dinners + utensils + napkins (1/person)*
- Trash bags (3)*

Field Station Only:

- Vocabulary stickers: (1/student)
 - o Endangered
 - o Morphometric data
- Calipers (1)
- Stuffed Sea Turtle (1)
- Soft measuring tape (1)

Timing:*

Time	Activity/Location	Breakdown
2:25 – 3:30PM	Lecture and Prep: Field Station	2:25 – 2:50PM: Lecture 2:50 – 3:00PM: Gear Check 3:00 – 3:20PM: Drive to Research Location 3:20 – 3:30PM: Park & Unload
3:30 – 8:45PM	Field Research: Field	3:30 – 3:40: Set-up camp 3:40 – 3:50: Introductions 3:50 – 4:00: Overview of Research rotations 4:00 – 8:45: Research *Dinner should be eaten at will.
8:45**	Return to Field Station	**See decision tree below

**Check with Field Research Manager about which schedule for Sea Turtles to use.*

Overview of Research (Instructors Only):

- Students will participate in an ongoing turtle monitoring program run by Grupo Tortuguero.
 - o Sea turtles have been monitored by community scientists in Bahía since 1980 (Antonio Resendiz and Co. but the community began to be more involved around 1998-2000).
 - o Grupo Tortuguero has been in existence since 2018, some of the people who are now part of the group started with Antonio as children and grew up working on this project.
- Ocean Discovery Institute has been involved in sea turtle research since 2004.
- Bahía de los Ángeles is a small-scale coastal gillnet fishery. Coastal gillnet fisheries are one of the most common forms of fishing throughout the world. A gillnet is a wall of netting that hangs in the water column, typically made of monofilament. Mesh sizes of the gillnet are designed to allow fish to get their head through but not their body. The fish's gills then get caught in the mesh as the fish tries to back out of the net.
- Unfortunately, this type of fishing has high rates of bycatch (shark spp., turtle spp., fish spp., etc.). Bycatch is when other marine species, which aren't the fisherman's target species, are caught in the gillnets.
- Sea turtles are one species that have been subject to bycatch over the years. Turtles need to come to the surface every few minutes to breathe, but when they get caught in gillnets, they are unable to surface and can die.
- In the past, Ocean Discovery has worked with several scientists to study ways to reduce sea turtle bycatch from gillnet fishing, including the use of sensory-based deterrents. Sensory-based deterrents attempt to help an animal use its senses (sight, hearing, smell, taste, or touch) to locate a net and be able to avoid it. Ocean Discovery students and their scientist mentors have tested visual deterrents (attaching shark shapes – a natural predator or sea turtles and lights to nets so animals can see them) and acoustic deterrents (attaching speakers to nets so animals can hear them). These types of sensory deterrents were all effective in reducing the number of sea turtles caught.

Field Research**Lecture**

Sea Turtles Overview:

- There are seven species of sea turtles in the world. **(SLIDE)**
 - o Currently six of the seven are endangered.
 - o Define endangered: seriously at risk of going extinct.

- Five of the seven types of sea turtles can be seen here in Bahía. **(SLIDE)**
 - o Green (most abundant)
 - o Olive Ridley
 - o Hawksbill
 - o Loggerhead
 - o Leatherback

- Common threats to sea turtles are: **(SLIDE)**
 - o Destruction of nesting beaches
 - o Disease
 - o Artificial light
 - o Harvest by humans
 - o Pollution
 - o Fisheries bycatch
 - o All of these occur here in Bahía, so there is a need to monitor turtle populations to make sure they stay healthy.

- Sea turtles have been monitored by community scientists in Bahia since 1980 - this is another example of community science. **(SLIDE)**

- Ocean Discovery students have been involved in sea turtle research since 2004. **(SLIDE)**
 - o Connect this to the Fisheries research project students participated in earlier this week.
 - o In the past, Ocean Discovery has worked with several scientists to study ways to reduce sea turtle bycatch from gillnet fishing, including the use of sensory-based deterrents (lights, sounds, shark shapes, etc.)

- This evening we will be working alongside volunteers from Grupo Tortuguero.
 - o Grupo Tortuguero continues to carry out the conservation work started back in 1980.
 - o Grupo Tortuguero does sea turtle population monitoring and sea turtle nest monitoring along the beaches.

- Think-Pair-Share
 - o What are some questions Grupo Tortuguero might be interested in answering?

- Investigate
 - Two pieces of information scientists use to check the overall health of sea turtles are:
(SLIDE)
 - 1) overall number of sea turtles in the population
 - 2) characteristics of the population- called morphometric data.
 - Define morphometric data – outside measurements of living organisms. **(SLIDE)**

- Data Sheet **(SLIDE)**
 - Review Grupo Tortuguero Morphometricos Datasheet
 - (Hand each student a data sheet.)
 - Ask students to translate some of the datasheet.
 - Demonstrate some of the measurements using the calipers and soft measuring tape.
 - Invite students up to try using the calipers on the stuffed sea turtle.

- By capturing information like this science leaders can:
 - Track the overall sea turtle populations and characteristics of the population and look for change over time.
 - Know where sea turtles are traveling and understand more about their life cycle.

- Gathering Evidence. **(SLIDE)**
 - Tonight, Grupo Tortuguero will set nets in the bay and then check those nets for sea turtles approximately every 75 minutes.
 - Any turtles they find in the nets will be removed and placed in the boats and brought back to the beach where we will take their morphometric measurements.
 - Once we have gathered the evidence, we will release the turtles back to the ocean from the beach.

- Sea Turtle Trivia!
 - One of the special opportunities we have is to go out on the boats with the fishermen to check the nets tonight.
 - Because space is limited only a few people will get to go.
 - We will do some trivia to determine the order that people get to go on the boats.
 - Review rules:
 - I will read a question out loud.
 - Everyone will have silent think time.
 - I will choose an name from the cup.
 - They can answer the question or pass.
 - If they pass I will choose another name.
 - There is no penalty for guessing the wrong answer.
 - Questions:

- *Be sure to track students names who answer correctly.*
- Name one of the seven types of sea turtles
 - (Green, Olive Ridley, Hawksbill, Loggerhead, Leatherback)
 - Accept two answer for this question
- Define morphometric data.
 - Accept one answer.
- What is a common threat to sea turtles?
 - (Destruction of nesting beaches, disease artificial light, harest by humans, pollution, bycatch).
 - Accept one answer.
 - Accept two more answers but explain that these are back-up spots on the boat and we may have to leave before they get to go.
- Formal Introductions (**SLIDE**)
 - When we arrive today be sure to walk up to each member of the Grupo Tortuguero and introduce yourself.
 - Shake hands and introduce yourself.
 - Practice introducing yourself in Spanish.
 - Hola! Me llamo...
 - Buenas tardes. Mi nombre es...
- Prep Science Notebooks:

<p style="text-align: center;">Field Research: Sea Turtle Monitoring</p> <p style="text-align: center;">Explore & Wonder</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black; text-align: center;">Observations</td> <td style="width: 50%; border-bottom: 1px solid black; text-align: center;">Questions</td> </tr> <tr> <td style="border-right: 1px solid black; height: 300px;"></td> <td style="height: 300px;"></td> </tr> </table>	Observations	Questions			<p style="text-align: center;">Investigate</p> <p>What types of evidence did we collect?</p> <p>Observational Study or Controlled Experiment?</p> <p style="text-align: center;">Make a Difference</p> <p>How could this research be used to make a difference?</p> <p style="text-align: center;">Vocabulary</p> <hr style="width: 80%; margin: 0 auto;"/>
Observations	Questions				

Gear Check

- Make sure everyone knows what group they are in.
- Everyone check batteries on headlamps/flashlights.

Drive to Research Location

- TBD by Grupo Tortuguero
- Team Leads to check in with Grupo Tortuguero
 - o Determine if students can do introductions vs. volunteers are busy with a sea turtle.
 - o Check if students will be able to accompany fishermen out to check nets. Confirm number of students and adults per trip.

Introductions

- Each student does a personal introduction to each member of Grupo Tortuguero.
- Review Data Collection Methods:
 - o Morphometrics
 - o Barnacle removal
 - o Data collection
 - o Blood & Tissue Samples*
 - **TBD – this always needs to be confirmed with Grupo Tortuguero b/c they apply annual for permits to do this research.*

Data Collection

**During net checks, sometimes students and adults are able to check the nets with the fishermen. Be sure:*

- *If you send a student, you must send an Ocean Discovery adult at the same time (mentors get priority).*
- *Figure out a way to make this opportunity “fair”, i.e., draw names from a hat, etc.*
- *Have a list of students ready to go because the net checks hap*
- *pen quickly – students need to be on stand-by.*
- *All students and adults must wear a life jacket while checking nets.*

Sea Turtles

- When fishermen arrive back from nets help unload turtles from the boat.

Data Collection

**Students will rotate through these three jobs. Field Research Manager/Team Leads try to appropriately rotate students so that each group gets to experience each job with a minimum of one sea turtle.*

1. Morphometrics

- Maximum number of people around a turtle is FOUR (including one Grupo Tortuguero person).

- Assign roles:
 - Turtle Intake Card:
 - Records information on laminated card provided by Grupo Tortuguero.
 - See example Turtle Intake Card below.
 - Photographer:
 - Takes photos of:
 - Completed Turtle Intake Card near head of turtle
 - Overhead shot of turtle with the completed Turtle Intake Card visible.
 - Morphometrics helper:
 - If Grupo Tortuguero volunteer feels it is appropriate, students may help take some measurements.
 - Emphasize the importance of precise measurements.
 - Materials person:
 - Hands supplies over as needed.
 - Stands to the back of the group.

2. Data Collection

- Data Recorders (all students but two) work alongside a Grupo Tortuguero volunteer to record morphometric data.
 - Each student receives a clipboard, pencil and “Ocean Discovery Sea Turtle Morphometrics” data sheet.
 - Record measurements from Morphometrics team.
 - All students are recording the same data.
 - Collect completed datasheets.
 - Grupo Tortuguero volunteer records on a separate data sheet for Grupo Tortuguero data collection.
- Capture/Recapture persons (2) – (stands to the back of the group) - checks turtle tag number for whether this turtle has been captured before and shares data with the group.
 - Set up map of Baja (pin to posterboard and set on the easel).
 - If data is available show past locations of turtle using map and pins.

3. Barnacle Removal

- Students will help clean barnacles off turtles.

Sea Turtle Release

- When all turtles have been measured help release them back to the ocean by way of the beach.
- Make this a big deal – these sea turtles have helped us learn more about sea turtles in general.

**Return to Field Station Decision Tree

- Consider returning to the field station early if:
 1. All students have experienced each role for 1-2 turtles:

- a. Morphometrics
 - b. Barnacles
 - c. Data Collection
2. You have checked with Erica and she no longer needs the students help.

Ocean Discovery Sea Turtle Morphometrics Data Sheet

Nombre de la tortuga: BLA
(Name of turtle)

Sexo: I / H / M
(Sex)

Especie: prieta/negra Golfina Amarilla/Perica Laud Carey
(Species)

Informacion de Captura:
(Capture Information)

Fecha: _____ Hora de captura: _____ Sitio de monitoreo: _____
(Date) (Hour of capture) (Monitoring site)

Sustrato: _____ Marea: Pleamar Bajamar Muerta
(Substrate) (tide) (high tide) (low tide) (dead tide)

Metodo de captura: red / manual / otro
(capture method) (net) (by hand) (other)

Informacion de placas:
(Turtle tag information)

Recaptura: Si / No Evidencia de placas Viejas: Si / No Comentarios: _____
(Recapture) (Evidence of old turtle tag) (Comments)

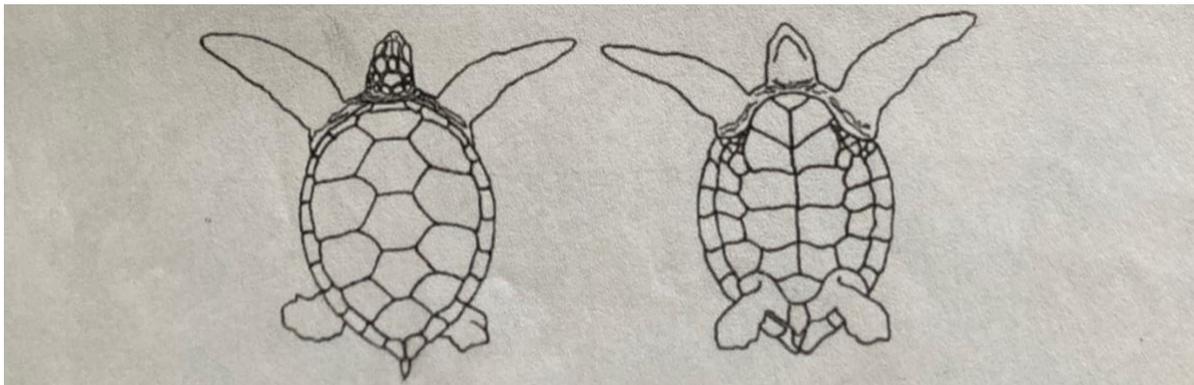
Placas Viejas # dcha: _____ izq: _____ Plastico / Metal / Anterior / Posterior
(Old tag # on right) (on left) (Plastic) (Metal) (Front) (Back)

Placas nuevas # dcha: _____ izq: _____ Anterior / Posterior
(New tag # on right) (on left) (Front) (Back)

Informacion de muestras:

TIPO (type)	SI	NO	LOCALIZACION (Location)	COMENTARIOS (Comments)
Fotografia				
Sangre				
Piel				
Otras				

Parasitos: (Presencia / Ausencia) Epibiontes: (Presencia / Ausencia)
(parasites) (present) (absent) (epibiontes) (present) (absent)

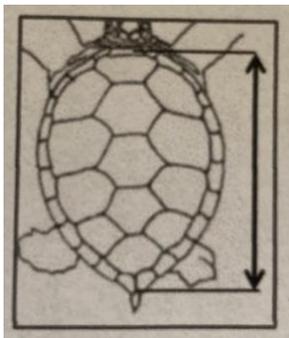


(Indicar epibiontes, cicatrices, marcas, etc.) (Indicate epibionts, scars, marks, etc.)

Datos morfometricos:

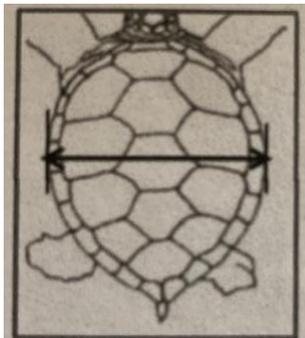
(Morphometric data)

Largo Recto Caparazon
(long straight shell)



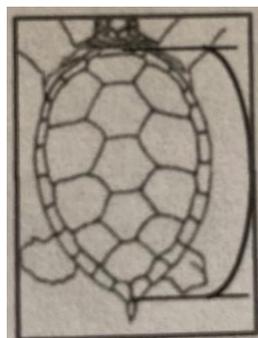
LRC: _____ cm

Ancho Recto Caparazon
(width straight shell)



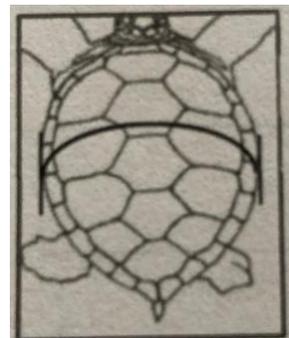
ARC: _____ cm

Largo Curvo Caparazon
(long curved shell)



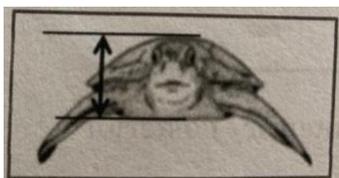
LCC: _____ cm

Ancho Curvo Caparazon
(curved shell width)



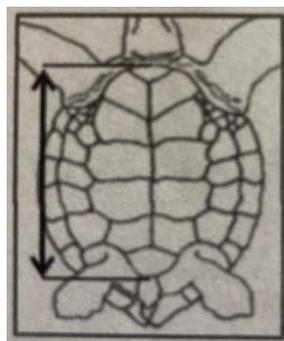
ACC: _____ cm

Profundidad de cuerpo
(body depth)



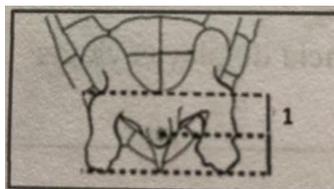
PC: _____ cm

Largo de Plastron
(Plastron length)



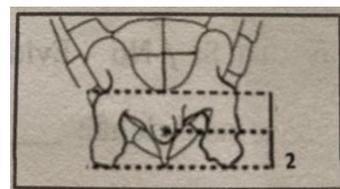
LP: _____ cm

Largo Pre-Cloacal
(Pre-cloacal length)



LPreC: _____ cm

Largo post-cloacal
(Post cloacal length)

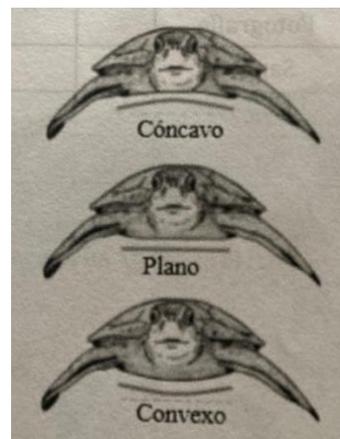


LPC: _____ cm

P (kg) : _____ Presencia de unas: SI / NO
(presence of some)

Morfologia del Plastron:
(plastron morphology)

Comentarios: _____
(Comments)



Turtle Intake Card Example

ID: BLA 150821-0
NOMBRE:
ESPECIE: CM
SEXO: H
PLACA IZQ: ICC092
PLACA DCHA: ICC301

Day 8: Recovery from Double Research Day Implementation Agenda

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Study Hall for Mid-term	Team Leads
8:30 am	Mid-term Exam	Team Leads
9:15 am	Siesta	Additional Staff
	Grade Mid-term Exams	Team Leads
10:00 am	Mid-term Exam Reflection	Team Leads
10:30 am	Sea Turtles: Analyze and Make a Difference	Team Leads
11:00 am	Souvenir Shopping	Team Leads
12:25 pm	Return to Field Station	Team Leads
	- Check student medication back into first aid station	
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence -or- Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Siesta	PM Lead 1
2:30 pm	Salud	PM Lead 2
4:00 pm	Know it! Own it!	Field Research Manager & Team Lead 2
6:30 pm	Dinner	Program Manager
7:05 pm	Servant Leadership	PM Lead 1
7:35 pm	Exercise	PM Lead 2
8:30 pm	Sleep Prep	PM Lead 1
9:00 pm	Bedtime	PM Lead 2

Community Building

Day 8

Timing:

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- N/A

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).

Food & Conversation

Question: What is something you find challenging to do?

Review Community Question:

- (Read today's question out loud.)

Community Building Activity: Shout Outs!

Overview: Taking time to recognize when someone else has been brave or overcome a challenge.

Review Purpose of Shout Outs:

- In a community environment like this where we are living, learning, and work together it is important that we recognize others for their contributions to the team.
- It is also good to take a moment to focus on others instead of ourselves.

Directions:

- We will recognize people who have been brave, have overcome a challenge, have been their best-self, or contributed to the team, by giving that person a Shout Out.
- When you give a shout out – use a strong voice. Speak clearly and slowly so that everyone around you can hear the shout out you are giving another person!
- You can give a Shout Out! to anyone, student, staff, or mentor.
- Example:
 - “I want to Shout Out Isabela, because she has gone out of her way to make sure all the cleaning supplies are put away at the end of Chores every day. It helps keep the field station tidy and helps Alejandrina, so she doesn't have extra work to do after a full day of cooking for everyone. Thanks Isabela!”
 - **Instructor Note: Try to make the example Shout Out! a real Shout Out! for a student if possible.**
 - Some areas you could consider giving shout-outs for:

- Being Brave – a person who took a risk, did something they were afraid of or nervous about, etc.
- Being Their Best Self – a person who has been curious, respectful, considered the safety of themselves or others, someone who invited others into a group or conversation, etc.
- Having a Growth Mindset – a person who faced a challenge, someone who asked for help when facing an obstacle, etc.

Activity:

- Do as many Shout Outs! as you have time for.

Debrief:

- We will have one more chance to do Shout outs! so keep your eye out for others you might want to shout out.

Morning Announcements

- Review daily schedule and any boat/snorkel groupings.
- Reminder new mentors arriving tonight
- Review gear for the day:
 - Wear: a swimsuit, water shoes or closed-toed shoes, hat, sunglasses, short/long sleeves.
 - Backpack: Science notebook and pencil, towel (optional)
 - Fill and bring a water bottle.
 - Snorkel gear & wetsuit
 - Apply sunscreen.
- Ask Facilities Manager if they have any updates to share.

Day 8: Curriculum

Supplies:

- "Day 8 Curriculum" PowerPoint
- Mid Term Exam (1/student)
- Mid Term Answer Key (5)
- Mid Term Exam Reflection (printed on card stock) (1/student)
- Bubble water (1 student)

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).
- If there were any recaptured turtles from the evening before open Internet of Turtles to share what is known.
 - Login: xx

Study Hall for Mid-term

Timing:

- 0:00 – 0:05 Intro to Mid-term
- 0:05 – 0:20 Create Flash Cards
- 0:20 – 0:30 Study Time – Flash Cards
- 0:30 – 0:40 Bubble Water Break
- 0:40 – 0:55 Study Time – Concept Maps

Intro to Mid Term

- Today we will be taking our mid-term. **(SLIDE)**
 - A mid-term exam is an opportunity to see what we understand so far and what we don't understand.
 - The mid-term will consist of multiple choice, short answer, and 1-2 sentence answer questions.
- Before our midterm we will have some additional time to prepare. **(SLIDE)**
 - We will all have time to utilize all our tools to prepare:
 - Flash Cards
 - Concept Maps
 - Study Time
 - Asking an Expert
- Remind student to Ask and Expert **(SLIDE)**

- While we are working to prepare for our exams today – don't forget to use this time to also seek help from an expert.
 - If you have a question about something you have been learning or need help understanding something, don't be shy!
 - Now is the time to get help 1 on 1 from one of our fabulous mentors!
 - Ask them questions – they are here to help!
- Let's start by updating our Flash Cards. **(SLIDE)**
 - One of the most basic ways to make knowledge your own is to memorize it.
 - Memorizing knowledge allows us to recall it and apply it to future learning.
 - Flash cards are one way to memorize knowledge.
- How do flash cards work? **(SLIDE)**
 - Science tells us flash cards are used to encourage active recall.
 - Using flash cards creates stronger neural connections in the brain.
 - Science has shown using flash cards to be an extremely effective way to improve memory.

Create Flash Card

- Flash cards have related information on both sides. **(SLIDE)**
 - Ex. Hypothesis
- Have students work in pairs to come up with some words and definitions they have learned in the last two days that they think would be important to memorize. **(SLIDE)**
 - Give students 3-4 minutes to look through their science notebook to come up with ideas.
- Brainstorm a flash card list. **(SLIDE)**
 - Write ideas on the board and then discuss as a group which should be turning into flash cards.
- Review Making a Flash Card.
 - (Hand out index cards to each student.)
 - As a group demonstrate how to create the first flash card step by step.
 - Have students copy each step with you.
 - It is important to write neatly so that you and other people can read your flash cards later.
- Have students create flash cards for the remaining words the group agreed upon.
 - Remind students to ask for help if they need it. Asking for help is part of having a growth mindset.
 - Have mentors help by checking that each student in their group has a complete set of three flash cards.

Study Time – Flash Cards

- How to use flash cards to study. **(SLIDE)**
 - When you look at flash cards you are trying to memorize what is on them.
 - Read them to yourself.
 - If you can remember what is on both sides correctly, put that card in one pile and if you can't put it in another.
 - Spend more time reading and rereading the cards from the pile you don't know.
 - Every now and then mix up the order of your flash cards.
 - Try it in reverse- read the definition, can you say the word?
- Give students five minutes to study their flash cards independently.
 - Remind students that science tells us we should be focused during this short study time.
- Partner students up and have them test each other using their flash cards.

Breaktime:

- Explain to students that while studying it's good to take short breaks every now and then.
- Give students a bubble water and 10-minutes of break time.

Study Time – Concept Maps

- Review concept maps are a tool. **(SLIDE)**
 - Concept maps are another tool we have to help us prepare for our mid-term.
 - Concept maps are one of the best ways to identify relationships between ideas and link them together.
 - Science tells us that understanding these relationships and making a visual representation of those connections can help you understand things at a much deep level and make it easier for you to remember and retrieve the knowledge later.
- How to study with a Concept Map. **(SLIDE)**
 - Take time to look over your concept map – try to remember your main ideas and the connections between ideas.
 - Cover up a bubble with your hand and see if you can remember what was in the bubble and the ideas connected to that bubble.
 - Turn your concept map over at some point and try to visualize it in your mind. What parts of it do you remember?
 - Spend more time looking over the sections you don't remember.
 - Finally, try taking a blank concept map and fill it in with what you remember.
 - Then take your concept map and compare it to the original to see what you remembered and what you don't.
- Give students time to study their concept maps independently.

- Remind students they can take a blank concept map to practice with.

Midterm ExamTiming:

- 0:00 – 0:05 Intro
- 0:05 – 0:40 Mid Term Exam
- 0:40 – 0:45 Siesta Overview

Intro:

- We are about to take our midterm exam. **(SLIDE)**
 - All feelings are valid (anxious, excited, nervous, calm, etc.).
 - You have done a lot to prepare for this, lectures, concept maps, flash cards, study hall, asking experts, etc.
 - This is how you want to show up for tests in high school and in college – prepared!
- Mid-term format. **(SLIDE)**
 - Multiple choice
 - Short answer (1-2 sentence answer) questions.
 - 13 questions
- Test Taking Tips. **(SLIDE)**
 - Read questions carefully!
 - If you don't understand the directions to something – raise your hand.
 - Take your time – there is no need to rush.
 - If you finish early – check your work.
 - If you forget something or feel like you don't know it, try skipping it and returning to it at the end.
 - When you finish – stay seated and turn your exam face down on your desk, sit quietly until the exam is finished.

Mid Term Exam

- (Pass out exams.)
- (Set the digital timer for 25 minutes.)
- (Give students 5- and 1- minute warnings.)

Siesta Overview

- Since we had a long day of double research yesterday and just took our mid-term we are going to have some additional rest time today.
 - We will have an 45 minutes of siesta time.
 - The expectations are the same as normal siesta – read, rest, write.
 - The field station will be quiet.
 - You can put your cots under the awnings for some shade.
 - Stay within the quad area.
- Return to the classroom by 10AM.

Siesta/Grade Midterm Exams

Timing:

- 0:00 – 0:45 Siesta

Siesta

- (Monitor students while grading mid-term exams.)
- Make a note of any students who might need a Growth Mindset conversation based on their test score.
- (Five minutes before the end of siesta have students return their cots to their storage location.)
- (Play Know it! Own it! song 3 minutes before the end of Siesta.)

Mid-term Exam Reflection

Timing:

- 0:00 – 0:05 Introduction
- 0:05 – 0:20 Mid Term Exam Reflection
- 0:20 – 0:30 Exam Corrections

Introduction

- In a moment we are going to return your graded midterm exam to you. **(SLIDE)**
 - When receiving an exam back, it is very important to look it over carefully.
 - There can be many feelings when getting an exam back but try to avoid judging yourself and rather think of this as evidence you have gathered.
 - A returned exam is simply evidence of what you know and what you don't know YET.
 - A returned exam can also be a reflection of how effective your study tools have been (flash cards, concept maps, study time, ask an expert).
 - It is important to look at this evidence and analyze it so that you have information about how to proceed.
- We will start by taking a moment to analyze our exam and the gathered evidence. **(SLIDE)**
 - Each person will:
 - Look over your test to get an idea of which questions you got wrong and which you got correct.
 - Fill out the Mid Term Exam Reflection.

Mid Term Exam Reflection

- Give students time to fill in the Mid Term Exam Reflection.

Exam Corrections

- We will leave these reflection reminders at our desk space so that we can be reminded of how we want to best prepare for our final exam in a few days.
- One last way you can use an exam that is returned to you, is to correct mistakes you made on the exam.
 - Remember, a growth mindset means if you get an answer wrong it is because you don't know it YET, but you are still able to learn that information. **(SLIDE)**
- Correcting exam questions can help you: **(SLIDE)**
 - Better understand the material.
 - Be more prepared if the same or similar test question appears again.
 - Help make stronger neural connections – which can make it easier to retrieve this information in the future.
- We will take the next 10 minutes to make some exam corrections. **(SLIDE)**
 - Each person will:

- Work with their group and mentor (an expert!) to correct a minimum of three exam mistakes.
- Write your correct answer out in a complete sentence on your exam.
- If you choose to correct a multiple-choice question you will also need to write a sentence explaining why the new answer is correct.

Sea Turtles: Analyze and Make a Difference

Timing:

- 0:00 – 0:20 Analyze
- 0:20 – 0:30 Make a Difference

Analyze:

- Review Field Research.
 - Have students open their science notebooks to “Sea Turtles” page.
 - Give students 5 minutes to fill out their notebook page.
 - *Teaching Note: There is often no time to do this during the actual research.*
 - Group-Share:
 - Have students share within their small group and then select several students to share whole group about:
 - Observations
 - Questions
 - What type of evidence were collected?
 - Observational study or controlled experiment?
 - How do you know?
- If any turtles were recaptures (previously captured) look them up on Internet of Turtles to see where they have been seen before.
 - How far did this turtle travel?
 - Why do you think turtles travel this far?
 - How can scientists use data from turtle recaptures?

Make a Difference

- We will now consider how to Make a Difference (**SLIDE**).
 - Group-Share:
 - How could this research be used to make a difference?
- Review how Grupo Tortuguero communicates their findings to others:
 - Grupo Tortuguero conducts their research in a Natural Protected Area, therefore all their data is shared with the National Parks.
 - They are part of a larger network – Grupo Tortuguero de las Californias which works for the conservation of sea turtles through the commitment of all people within a community from fishermen to students to teachers to scientists to hotel workers and everyone in between.
 - They use social media to communicate with the community of Bahía de los Ángeles.
 - They host booths at events such as Conservation Week in the community.
 - They run Turtle Camp for kids in the summer.

- The community is very involved with this organization because it is the community that is doing the monitoring!
- If time allows: Think-Pair-Share:
 - How did it feel to do this type of science? Do you think you would like to be a science leader who works with sea turtles? Why or why not?

Souvenir Shopping

Timing:

- 0:00 – 0:05 Healthy Bodies! Higher Goals!
- 0:05 – 0:25 Drive to Ricardo's Dive Shop
- 0:25 – 1:00 Souvenir shopping
- 1:00 – 1:20 Drive back to Field Station

Healthy Bodies! Higher Goals!

- We will be heading to Ricardo's Dive Shop so that anyone who would like to may purchase souvenirs.
- Ricardo's also has snacks/treats available to purchase.
- Everyone likes a snack so feel free to buy something for yourself to eat on the way back but remember:
 - Healthy Bodies! Higher Goals! – Ricardo's snacks aren't the most nutritious so we will all be limited to TWO snacks/treats.
 - This includes sodas.
 - Example: you could buy a Mt. Dew and a bag of chips for yourself = 2 treats.
 - Example: you could buy two bags of chips for yourself = 2 treats.
 - Exampe: you can not buy two bags of chips and soda. = 3 treats.
 - No food will be allowed back in the dorms!

Self-Reflection

Day 8

Supplies:

- Rules for Writing (1/student)
- Thank You Cards (2/student) + 10 additional
- Pencils (1/student)
- Clipboards (1/student)
- Thank You Speech card (6)
- Whiteboard + easel (1)
- Dry erase marker (1)

Set Up

- Write sentence starters on the whiteboard (see below).

Rules for Writing

- Have students take turns reading the rules out loud.

Writing Prompt #1

Overview:

- These prompts can be about anything you want.
- Just keep the pen on the page and keep writing.
- There will be more than one prompt, and just move into the following prompts as you can.

Writing

- Prompt 1: **This is what I know now that I didn't know then...** [5 mins]
- Prompt 2: **This is how I came to learn what I know now...** [3 mins]
- Prompt 3: **This was my biggest challenge...** [4 mins]
- Prompt 4: **This was how I made it through...** [4 mins, 2 min warning]

Pair-Share

- (If time allows) Pair students up so they can read their writing to each other.

Share out

- Ask students to share their writing with the group.

Writing #2: Personal Thank You Cards

Overview:

- Review why we do Personal Thank Yous.
 - Networking is a tool for **Full hearts! Powerful minds!**
 - Networking not only includes introducing yourself but making sure you say thank you after meeting or working with another person.

- Recognizing that someone else has gone out of their way to spend time or work with you is meaningful. Our mentors all spend time with you here in Baja because they believe in you. They believe that you can be the science leaders of tomorrow.
- Now is our time to say “Thank You” to them. Thank You’s should be personal if possible. Think about the ways that person has interacted with you. Helping you to understand something, sharing their journey to becoming a science leader, taking time to paddle board or snorkel with you, talking with you about things you find challenging, etc.
- Try to be specific about your experiences with your mentors. It is more meaningful and shows that you are genuinely grateful when you take the time to give a personal thank you.

Directions:

- Everyone will write a personal thank you card for each of the mentors that have been working with you for the last four days.
- There are some sentence starters on the board to help but feel free to write whatever is meaningful to you.
 - One memory I have of our time together is....
 - Something I enjoyed experiencing with you was...
 - You taught me...
 - You really helped me by....
 - Thank you for....
- We will collect these cards and give them to the mentors before they leave tomorrow morning.
- If there is another mentor who wasn’t in your group but that you want to write a card for just raise your hand and we will bring you an extra card.

Writing:

- Give 5-, 3- and 1- minute reminders of time left.
- While students are writing:
 - **A student must be selected for each mentor** to give the personal thank you when photo frame and cards are handed over.
 - Once students are selected explain their role, give them the “Thank-You Speech” card and have them fill it out.
 - Practice giving the thank-you speech with your students with a focus on speaking with a strong voice and taking up space.
 - Collect their thank-you speech card and place it with the cards so that the student can have it during the presentation.
- In the last-minute walk around and collect cards.
 - Sort them into a pile for each mentor.
 - Tie cards up in a pretty pile with twine (this will be part of their departure gift tomorrow).
 - Place a yellow sticky note on top of each pile with the mentor’s name.

Know it! Own it!
Day 8

Logistics

Supplies

- Laminated Index Cards with #1-25
- Vocabulary stickers (1/student):
 - Inform Hypothesis
- Binoculars (1/student)
- Bird ID Card (1/student)
- Bird Cut-Outs (1 set of 6)

Set Up

- Around the room place the six bird cut outs for Research Preview.
 - Cut outs should be slightly difficult for students to find- you want them to have to search using their binoculars.
- Create a piece of chart paper for each mini-research group to share their Wetlands research data. Include:
 - Our Hypotheses
 - Our Data
 - We accept/reject our hypothesis because....

Timing

Time	Activity/Location	Breakdown
25 minutes	Science Discovery Process In-Depth	4:00 – 4:05 Preview Knowledge 4:05 – 4:15 Analyze: Inform Hypothesis 4:15 – 4:25 Application of Science Discovery Process
35 minutes	Analyze & Make a Difference	4:25 – 4:45 Analyze 4:45 – 5:00 Share out
30 minutes	Paper Airplane Lab	5:00 – 5:20 Inform Hypothesis 5:20 – 5:30 Share Out
30 minutes	Study Skills*	5:30 – 5:40 Create Flash Cards* 5:40 – 6:00 Independent Study Time*
25 minutes	Preview Research	6:00 – 6:10PM: Engagement 6:10 – 6:15PM: Birds Overview 6:15 – 6:20PM: Notebook Prep 6:20 – 6:25PM: Clean-up

**** Study Skills time can be skipped if students need more time to work on Paper Airplane Lab. This is a day where you want to get as many students as possible to the place where they are accepting or rejecting their hypothesis.***

Lesson

Science Discovery Process In-Depth

Preview Knowledge:

- Today we will do things a bit out of order.
 - We will start with the Science Discovery Process and then move onto analyzing our data from this morning's research.
- Have students take out SDP Concept Map from their folder.
 - Preview Knowledge. (**SLIDE**)
 - Ask students what they already know about the Science Discovery Process.
- Continuation of Analyze.
 - We are going to continue looking at the "Analyze" bubble.
 - Today we will focus on "Inform Hypothesis". (**SLIDE**)
 - Have students:
 - Write "Inform Hypothesis" in Analyze bubble.
 - Think-Pair-Share: What do you think Inform Hypothesis means?

Analyze: Inform Hypothesis

- Inform Hypothesis:
 - Define Inform Hypothesis: to accept or reject your hypothesis based on gathered evidence. (**SLIDE**)
 - A hypothesis should be accepted if the evidence collected supports the hypothesis.
 - A hypothesis should be rejected if the evidence collected does NOT support the hypothesis.
 - Rejecting a Hypothesis – is okay. (**SLIDE**)
 - We learn just as much from a rejected hypothesis.
 - Scientists NEVER change their hypothesis to match their data, however, if a hypothesis is rejected a scientist may already have an idea of what happened and may immediately begin writing a new hypothesis to test.

Application of Science Discovery Process

- Think-Group-Share
 - Example #1
 - Hypothesis: If a plant gets more water, then it will have bigger flowers.
 - Investigation: Take two plants with no flowers and put them next to each other in a greenhouse.
 - Give plant #1: Gets 1 cup of water twice a day
 - Give plant #2: Gets 1 cup of water once a day

- Gather Evidence: Measure the two largest flowers on each plant, from the tip of one petal to the tip of the petal directly opposite in centimeters (to the nearest tenth of a centimeter).
- Data Set: on slide.
 - Plants 1-3 average: 14.63
 - Plants 4-6 average: 15.93
- Inform Hypothesis:
 - All students write down a full sentence to accept or reject their hypothesis.
 - Reject
- Example #2
 - Hypothesis: If I feed fish, Fish Food A then they will grow faster?
 - Investigation: A scientist takes 10 fish that are all four centimeters long when measured from mouth to the fork of their tail. All of the fish are kept in the same tank. Half the fish are fed 2 oz of Food A twice a day, the other half are fed 2 oz of Food B twice a day at the same time. All fish were measured again after three months.
 - Evidence: (on slide)
 - Food A Average: 11.6
 - Food B Average: 11.0
 - Inform Hypothesis
 - All students write down a full sentence to accept or reject their hypothesis.
 - Accept
- Example #3 (SLIDE):
 - Observations: Sometimes water shot out of a water gun goes further than other times. People shoot water out of their water guns at different angles.
 - Question: I wonder if the angle of the water gun effects how far the water will go?
 - Hypothesis: If I create a greater angle to the floor with my water gun then, the water will shoot further.
 - Investigation: Take 14 of the same water guns and fill them with 30mL of water. With two of the water guns, create an angle of 15° to the floor, hold the trigger for 3 seconds, and measure the distance of the water in inches. With two of the water guns, create an angle of 30° to the floor and shoot the water. Continue with two guns for 45°, 60°, 75°, 90°, and 0° angles with the floor.
 - Evidence: Measure in inches the distance the furthest droplet of water goes for each water gun.
 - Data on slide.
 - Data set: on slide

- Inform Hypothesis
 - All students write down a full sentence to accept or reject their hypothesis.
- Hand out Inform Hypothesis vocabulary sticker.
 - Have students add this to their SDP Concept Map next to “Analyze Bubble”.

Analyze & Make a Difference

Analyze

- We will now examine the results of evidence we gathered in the wetlands and inform our hypothesis. **(SLIDE)**
 - (Show Analyze in Science Discovery Process.)
- Have students open their science notebooks to “Wetlands” page and review the hypotheses they wrote. **(SLIDE)**
 - **If** changes in elevation impact plants, **then** we should see a change in the types and amounts of plants as we survey from the uplands to the lowlands.
 - **If** changes in elevation impact animals, **then** we should see a change in the types and amounts of animals as we survey from the uplands to the lowlands.
- Each group will examine their evidence, accept or reject their hypothesis, and share this with the group. **(SLIDE)**
 - Each group will:
 - Transfer their hypothesis and evidence to the chart paper.
 - Examine their evidence.
 - Determine if their evidence supports or doesn’t support their hypothesis.
 - Write a 1-2 sentence explanation of why they are accepting or rejecting their hypothesis.
 - Each group must be prepared to share out with the group.
 - Focus on: Taking up Space & using a Strong Voice.
 - (Have students find their mini-research group and hand back their datasheets.)
 - You will have 15 minutes to analyze your data as a group.

Share Analysis

- Choose a group to share their work.
 - Focus on the two students Taking Up Space (new skill).
- Ask other groups to share their results.

Paper Airplane LabInform Hypothesis: (SLIDE)

- Be sure all students have finished from the previous day:
 - Find averages of your data and record them.
 - Find trends and record them using full sentences in your notebook.
 - Look for and identify outliers in your data, record if you have any or none.
- Today:
 - In your science notebook record:
 - 1) If you accept or reject your hypothesis.
 - Include 1-2 sentences about what data lead them to accept or reject their hypothesis.
 - 2) New and different hypothesis you would like to test.

Share Out:

- Pair up pairs.
 - Have each pair explain what their hypothesis was, if they accepted or rejected their hypothesis and why they did so.
- If time allows have a few pairs of students share their hypothesis and what data lead them to make the decision to accept or reject it.

Study Skills*

** Study Skills time can be skipped if students need more time to work on Paper Airplane Lab. This is a day where you want to get as many students as possible to the place where they are accepting or rejecting their hypothesis.*

Create Flash Cards

- Give students two minute to find things they want to turn into flash cards.
- Brainstorm these ideas as a group. **(SLIDE)**
- Give students 5-10 minutes to create these flash cards.

Independent Study Time (SLIDE)

- You will have some independent study time.
- Based on your mid-term and mid-term reflection you can decide how you want to use this time.
- Some options include:
 - Studying with flash cards.
 - Studying with a concept map.
 - Ask an Expert.
- Remind students to look over their mid-term reflection to decide how they want to use this time.

Research Preview

Engagement:

- Explain to students that around the classroom are a series of birds.
- Their goal is to locate the birds using binoculars and gather evidence about:
 - The type of bird
 - The behavior of the bird
 - Review types of behaviors.
 - Flying
 - Resting
 - Eating
 - Swimming
 - Have students open science notebooks to an empty page at the back.
 - Have students copy “Bird Data Sheet” into their notebook (**SLIDE**)
- Review tools:
 - Bird ID card
 - Binoculars
 - Demonstrate how to use binoculars.
- Give students 5 minutes to locate birds around the room and record their evidence.
- Debrief:
 - What evidence were you able to gather?
 - What was challenging?

Birds Overview

- Introduce Mujeres Con Alas:
 - Mujeres Con Alas is a community science group that has been monitoring bird populations for over six years. (**SLIDE**)
 - The group consists of nine women who work in pairs and make three trips a month to three locations (La Gringa, Punta Arena, and El Rincon) to monitor bird populations. (**SLIDE**)
 - They do their monitoring in the mornings (~6:30am) and/or the evenings (~4-5pm).
 - The women walk a line along the shore and record the number and type of birds they find, as well as the GPS locations and behaviors they see the birds engaging in (i.e., eating, diving, resting, etc.) (**SLIDE**)
- Overview of Research
 - We will help them gather this evidence tomorrow. (**SLIDE**)
 - Each group will walk a transect along the shoreline of Punta Arena.
 - Each person will have a pair of binoculars to look for birds.
 - The women of Mujeres Con Alas will provide the details on data collection methods when we meet with them tomorrow.
- We will be departing early tomorrow at 6AM! (**SLIDE**)

- Wake up time will be 5:30AM.
- Be sure to get a good night's rest tonight!

Notebook Prep:

- Prep Science Notebooks (**SLIDE**):

Science Notebook

Field Research: Birds		Investigate
Explore & Wonder		What types of evidence did we collect?
Observations	Questions	Is this an observational study or controlled experiment?
		<hr/>
		Make a Difference
		How could this research be used to make a difference?

Clean-up

- Review clean-up procedure from yesterday.
- Dismiss students as they are done.

**Day 9: Birds
Implementation Agenda**

Time	Task	Lead
5:30 am	Wake Up & Field Ready	Program Manager
6:00 am	Grab snacks for car	Program Manager
6:10 am	Field Research	Team Leads
9:40 am	Return to Field Station - Check student medication back into first aid station	Team Leads
9:45 am	Breakfast	Program Manager
10:30 am	Community Celebration Prep	Field Research Manager Team Leads
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence -or- Resident Advisor
	Curriculum Meeting <ul style="list-style-type: none"> • Discuss plan for Celebrate Success Day. <ul style="list-style-type: none"> ○ See “Field Trip Overview” in curriculum for potential options. 	Field Research Manager
1:45 pm	Siesta	PM Lead 1
2:30 pm	Salud	PM Lead 2
4:00 pm	Know it! Own it	Field Research Manager & Team Lead 1
6:30 pm	Dinner	Program Manager
7:05 pm	Servant Leadership	PM Lead 1
7:35 pm	Exercise	PM Lead 2
8:30 pm	Sleep Prep	PM Lead 1
9:00 pm	Bedtime	PM Lead 1



Community Building
Day 9

N/A – Early depart for Bird Monitoring.

Field Research
Bird Monitoring

Overview

Research Contact: Mujeres Con Alas (Bahía de los Ángeles)

- Yahaira Torres, WhatsApp (+526151131246).
- Martha
- Mercedes

Research Location(s):

- Punta Arena

Supplies:

- All Supplies on **General Field Research Supplies Check List** (see above)
- Binoculars (1/pair of students)
- Clipboards + pencils (1/ pair of students)
- Mujeres Con Alas Datasheet (1/pair of students)
- Birds Field Research Protocol for Mentors (1/mentor)
- Bird ID Card (1/pair of students)
- Bird ID Guide (2)
 - A more robust bird guide like Audubon or Sibleys

Timing:

Time	Activity/Location	Breakdown
6:00 – 6:30AM	Prep & Transportation: Field Station	6:00 – 6:10AM: Gear Check 6:10 – 6:30AM: Drive to Research Location
6:30 – 9:10AM	Field Research: Field	6:30 – 6:40AM: Unload Vans & Prep for Field 6:40 – 7:00AM: Introductions & Research Overview 7:00 – 9:00AM: Field Research 9:00 – 9:10AM: Thank You’s/Load Vans
9:10 – 9:40AM	Return to Field Station	9:10 – 9:30AM: Drive to Field Station 9:30 – 9:40AM: Unload & Put Away Gear

Overview of Research (Instructors Only):

- Mujeres Con Alas is a community science group that has been monitoring bird populations for over six years.
- The group consists of nine women who work in pairs and make three trips a month to three locations (La Gringa, Punta Arena, and El Rincon) to monitor the bird populations.
- They do their monitoring in the mornings (~6:30am) and/or the evenings (~4-5pm).
- The women walk a line along the shore and record the number and type of birds they find, as well as the GPS locations and behaviors they see the birds engaging in (i.e., eating, diving, resting, etc.)

- Monitoring at Punta Arena is 2km transect and goes around the point.
- Monitoring at La Gringa is a 0.8 m transect from the wooden sign by the parking area and along the shore.
- Monitoring in El Rincon is a 0.8m transect and is tide dependent – it can only be done at low tide (so this location will not be used for our protocol).

Field Research

Drive to Punta Arena & Meet Mujeres Con Alas

- Give students snacks to eat on the ride there.
- Meet in parking lot (see map below).

Prep for the Field

- Take snacks.
- Fill water bottles from jugs. Leave water jugs in cars.
- Break students into four monitoring groups.

Introductions:

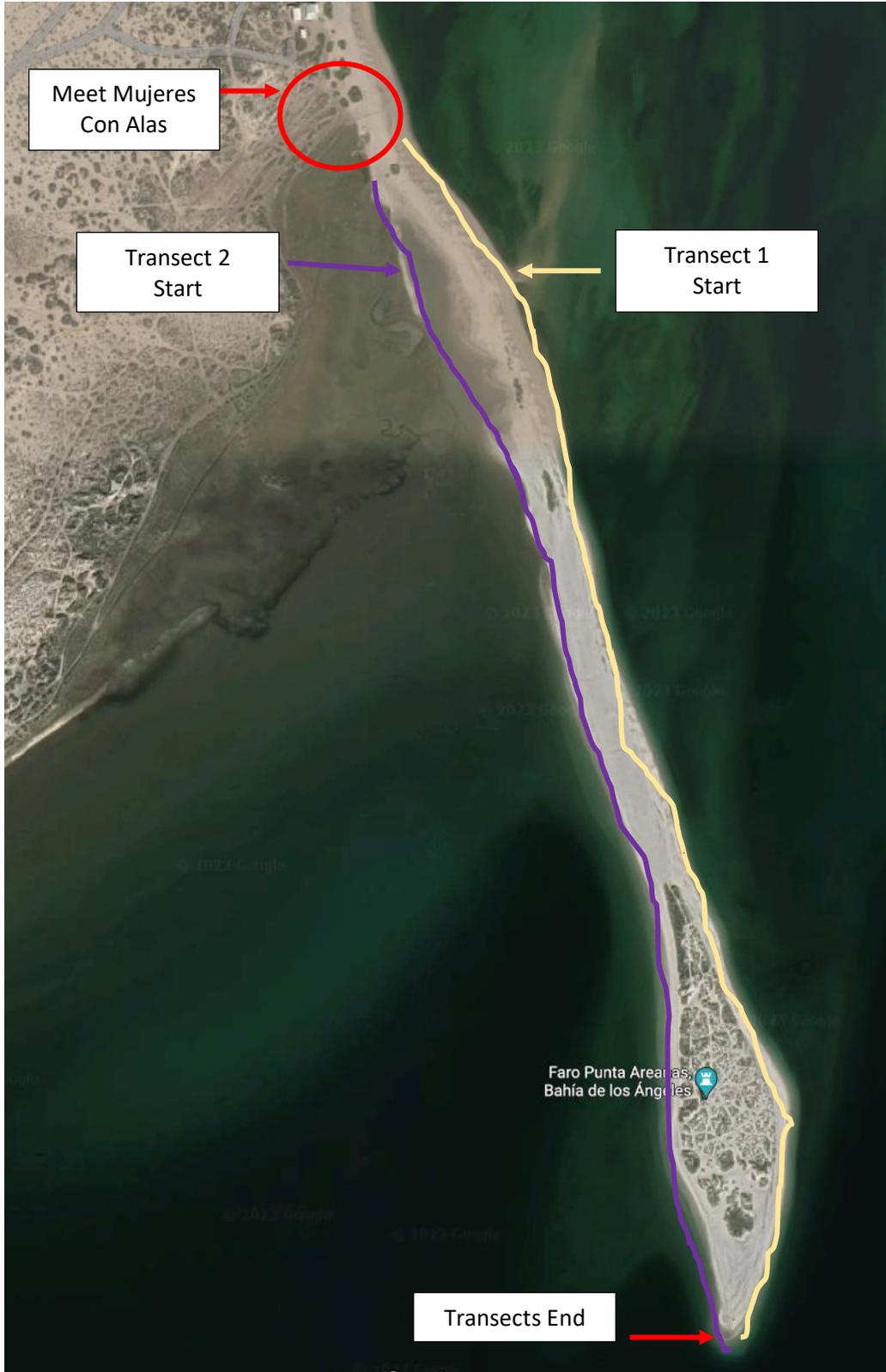
- Introductions with small groups.
 - o Have each person take a turn and introduce themselves and say their name and their favorite animal.
 - o Ocean Discovery students and staff should try to make their introductions in English and Spanish.

Overview of Project: (by Mujeres Con Alas)

- History of Mujeres Con Alas
- Explanation of Project
- Review of Data Collection Methods
- Do an introduction to binoculars.
 - o Have students try to focus on some items to practice.

Investigate:

- Students will walk a transect with Mujeres con Alas and collect and record data.
 - o All four groups will walk half of the 2m transect, starting closer to the parking lot and meeting at the sandy point.
 - Half the groups will walk Transect 1 (see map below).
 - Half the groups will walk Transect 2 (see map below).
- Data collection will include:
 - o Species identification
 - o GPS location of birds
 - o Bird behavior



Community Celebration Prep

Supplies:

- Community Celebration PowerPoint
- Thank You Talking Points (cut up)

Timing:

- 0:00 – 0:10 Overview
- 0:10 – 0:40 Science Discovery Process Slides
- 0:40 – 1:00 Thank You Slides

Overview

- Students are introduced to the concept of the community celebration.
 - This is our opportunity to Communicate all we have learned with the Community.
 - The community of BLA has been important in your experiences, so we want to share our gratitude by inviting everyone to a celebration!
- There will be two main components:
 - Mingling, Food & Conversation
 - Opportunity to expand your network by talking with members of the community.
 - This is a great time to utilize the skills you've been practicing – introductions and personal thank you's for people who have been a part of your experience here.
 - Presentation
 - a short presentation where everyone will present about the things you have learned and thank the people from the community who helped you learn them.
- Overview of Presentation
 - Each person will present 1-2 slides.
 - The entire presentation will be done in Spanish because that is the primary language spoken in Bahia.
 - All slides will be translated for you.
 - If you are feeling nervous about speaking Spanish remember to have a growth mindset about this.
 - It may be a bit difficult if you haven't spoken Spanish before, or if you haven't spoken it formally, but we will practice a lot.
 - With hard work we can accomplish anything!
 - Two types of slides:
 - (Show Community Celebration PowerPoint).

- Science Discovery Process slides – focus on how we learned about the Science Discovery Process and some of the other daily activities we participated in.
- Thank You slides – where we will say 1-2 sentences to thank each of the people who helped us while we were here living and learning.

Science Discovery Process Slides

- Our first job is to create the slides for the Science Discovery Process portion of the presentation.
- Students brainstorm who to highlight for each slide of SDP.
 - On whiteboard:
 - List the people/groups we have worked with.
 - List the slides.
 - Pair-Share.
 - Who would you match up with each slide and why?
 - List student suggestions on the board.
 - Vote on any where there are multiple contenders.
 - Team Leads make sure all options are appropriate.
- Brainstorm what we would want to say for each of these slides.
 - Record this to be transcribed and shared with Program Manager.

Thank You Slides

- Share the concept of customizing individual thank yous.
 - For each person you have been assigned to thank we have written a general thank you for you.
 - We want you to read them over, then add something to customize them so they are meaningful.
 - Thank you's should be personal – try to remember an experience you enjoyed with this person and add something about that to the thank you.
 - Personalization's can be funny, sincere, heartfelt, etc.
 - Example General Thank You
 - Thank you Hector for taking us into the field to learn about fishing practices in Bahia.
 - Personal Touch
 - And thanks for all the amazing jokes you told us!
- Work on personal thank yous.
 - Hand out thank you slips.
 - Read over.
 - Work on customization.

- Collect customized thank yous.

**If there is additional time before lunch give students siesta or salud time or relax after getting up early.*

Self-Reflection

Day 9

Supplies:

- Rules for Writing (1/student)

Rules for Writing

- Have students take turns reading the rules out loud.

Writing Prompt #1

- There are a so many memories we have made already down in Baja.
 - So many stories to share.
 - So many thoughts and ideas to share.
 - So many ways you have grown as a person to talk about.
- You will be responding to the prompt: "There are so many stories I most want to tell when I get home to San Diego, but this is how I will tell the story of the best thing that has happened to me..."
- You will have 13 minutes to write about this prompt.

Writing

- Prompt: **There are so many stories I most want to tell when I get home to San Diego, but this is how I will tell the story of the best thing that has happened to me...** [13 minutes, with a 2 min warning]

Editing

- Explain to student that they will be choosing one of their reflection pieces to share with the group in the chat book.
- Remind students of our goal to create a chat book this year that includes pieces by everyone.
- Today we will start this process. Each person will take the next 5-10 minutes to read through all their writing from the last nine days and choose two pieces of work they would want to include in the chat book.
- You will mark the pieces by putting a large star next to them.
- (Give students the rest of the time to work on this task.)

Collect Notebooks

- Have students leave their notebooks behind at the end of self-reflection.

Know it! Own it!

Day 9

Logistics

Supplies

- Laminated Index Cards with #1-25
- Application of Science Discovery Process – Day 9 (1/student)
- Would You Rather- Questions List (1/3 students)
- Tierra y Mar sticker (1/mentor)

Set Up

- Update Celebrate Success slides with tomorrow's itinerary.
- Ask mentors to stay after Know it! Own it! for five minutes so you can go over their roles during this portion of the program.

Timing

Time	Activity/Location	Breakdown
20 minutes	Mentor Introductions	4:00 – 4:10 Mentor Introductions 4:10 – 4:20 Getting to Know Each Other
15 minutes	Analyze & Make a Difference	4:20 – 4:35 Analyze and Make a Difference
40 minutes	Science Discovery Process In-Depth	4:35 – 4:40 Preview Knowledge 4:40 – 4:55 Summarize Data 4:55 – 5:15 Application of SDP
30 minutes	Paper Airplane Lab	5:15 – 5:35 Students Summarize Data 5:35 – 5:45 Share Data Summaries
30 minutes	Study Time	5:45 – 6:00 Study with a Partner 6:00 – 6:15 Concept Map
10 minutes	Research Preview – Celebrate Success	6:15 – 6:20 Celebrate Success 6:20 – 6:25 Clean-up

Lesson

Mentor Introductions

Mentor Introductions

- Introduce new mentors.
 - They will be with us the next four days.
 - Remember to take this opportunity to build your network by getting to know someone new.
- Ask each mentor to introduce themselves and give a brief 2-minute description of their current career.
- Welcome mentors into the group by giving them each a Tierra Y Mar group sticker.

Getting to Know Each Other

- We are going to take a little time now to get to know each other and our mentors.
- Would You Rather (**SLIDE**).
 - Directions:
 - Each group will get a list of would you rather questions.
 - One person picks a question & reads it to the group.
 - Everyone in your group answers.
 - Feel free to discuss/debate your responses.
 - Pass the list to someone else who will choose a question and read it to the group.
 - Continue asking questions and discussing your answers until your time is up.
 - Example:
 - Would you rather watch TV /or/ go to the movies?
 - If you would rather watch TV raise your hand.
 - If you would rather go to the movies raise your hand.
 - Ask a couple of adults and students to share their thoughts.
 - Why do you prefer TV to the movies?
 - What do you like about going to the movies? etc.
 - Activity:
 - Give each group a “Would You Rather- Questions List.”
 - Let each group ask questions until time is up.
 - Closing:
 - Thank everyone for sharing their thoughts.
 - Remind students and mentors that they have the next four days to get to know each other and to take as much advantage of that as possible.

Analyze & Make a Difference

- Give students five minutes to fill out their science notebook pages for “Birds”.

- Pair-Share (**SLIDE**)
 - What were some observations/questions you wrote down?

- Pair-Share (**SLIDE**)
 - Was today’s research an observational study or controlled experiment? How do you know?
 - Add to chart paper with other already existing research and type.
 - Add to chart paper and ask students if these were a study or experiment:
 - Whale sharks
 - Wetlands

- Pair-Share (**SLIDE**)
 - Ask students to look over the data on the board to see if they see any trends or outliers.
 - Example: What behaviors do you most often see birds engaging in? Do you think this would be true if you returned at noon? 4pm? Midnight?
 - Is there any other data you would want to collect if you were a science leader doing a study like this?

- We will now consider how to Make a Difference (**SLIDE**).
 - Think-Pair-Share (**SLIDE**):
 - How could the evidence collected today be used to make a difference?
 - How did it feel to do this type of science? Did you like collecting data on birds? Why or why not?

Science Discovery Process In-Depth

Preview Knowledge

- Have students take out SDP Concept Map from their folder.

- Preview Knowledge. (**SLIDE**)
 - Ask students what they already know about the Science Discovery Process.

- Final Day on Analyze (**SLIDE**).
 - Today we will focus on “Summarize Data”.
 - Ask students if they can recall what Summarizing Data means?
 - Summarize Data: presenting data in a meaningful and informative way.

Summarize Data

- We have talked about summarizing data before.
 - We used averages as a statistical tool to help us make sense of our data.
 - Example: Calculating student heights. (**SLIDE**)

- Another tool that can help us summarize data is graphs. (**SLIDE**)
 - Communicate information in a visual way.
 - Can show patterns and visually illustrate relationships in the data.
 - A way to get the point of an investigation across quickly.

- Interpreting Graphs:
 - Think-Pair-Share: (**SLIDE**)
 - What are some things this graph communicates to you?
 - Questions:
 - What is this graph about? How do you know? – title
 - Does the average University of Florida student spend more than half their money on housing?
 - Do University of Florida students spend a quarter of their money on Groceries and Transportation?
 - If you did the same analysis in July, do you think the graph would be the same? Why or why not?

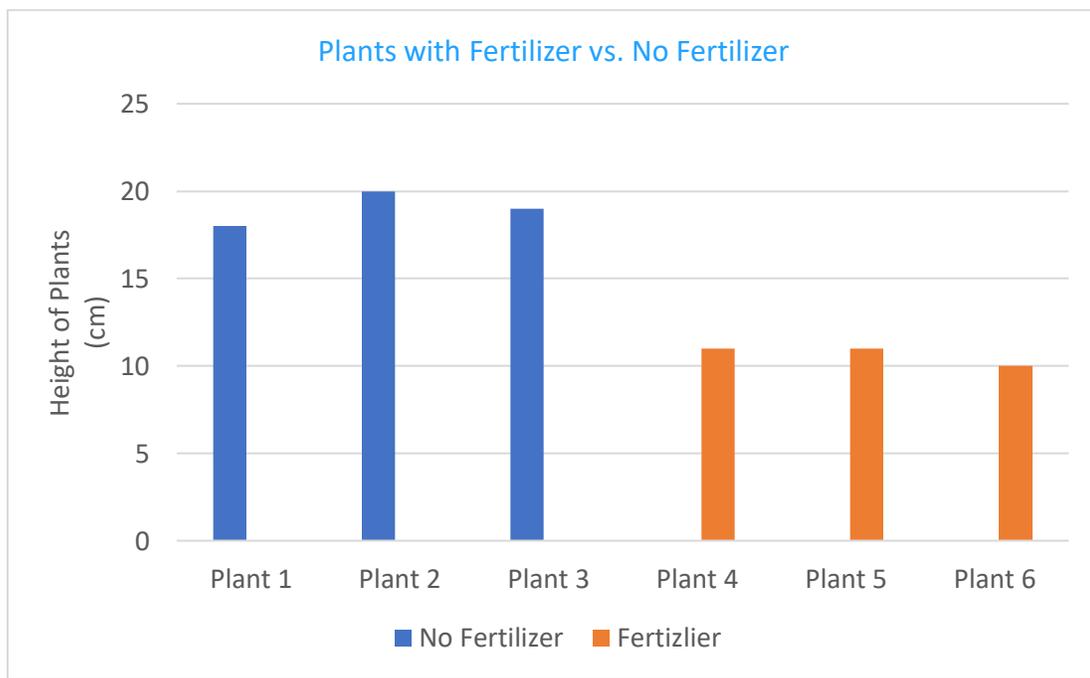
- Common types of graphs (**Slide**):
 - Line
 - Bar
 - Pie (Circle)

- Graphs should include:

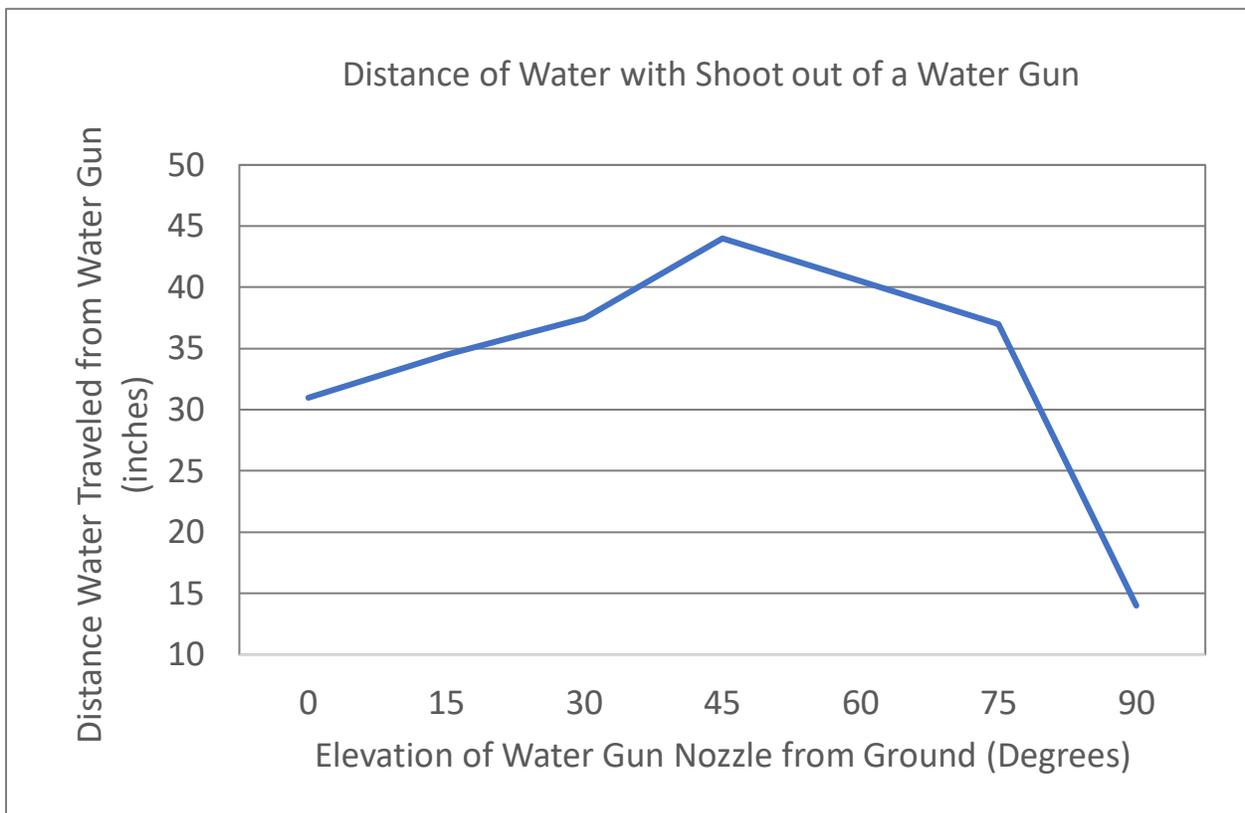
- x- and y- axis labels (including measurement labels when necessary)
- Title
- Data Points

Application of Science Discovery Process

- Each group will be given two example investigations to look over. **(SLIDE)**
 - Your goal is to look examine the evidence and inform the hypothesis.
 - Inform = accept or reject the hypothesis.
 - Use a full sentence to explain why you are accepting or rejecting your hypothesis.
- Give groups time to work on both problems.
- Come back together to review responses.
- Example #1 **(Slide)**:
 - Hypothesis: If a plant gets fertilizer, then it will grow taller.
 - Investigation:
 - Take six plants that are the same height and put them next to each other where they all get the same amount of sun each day.
 - Give plant #1, 2, and 3 fertilizer.
 - Give plants #4, 5, and 6 – no fertilizer.
 - Measure the heights of all plants in centimeters (to the nearest tenth of a centimeter) from the soil to the highest point on the plant every other day for 30 days.
 - Summarized Data:



- Inform Hypothesis:
 - Do you accept or reject the hypothesis? Why?
- Example #2 (Slide):
 - Hypothesis: If I create a greater angle to the floor with my water gun then, the water will shoot further.
 - Investigation:
 - Take 14 of the same water guns and fill them with 30mL of water.
 - With two of the water guns, create an angle of 15° to the floor, hold the trigger for 3 seconds, and measure the distance of the water in inches.
 - With two of the water guns, create an angle of 30° to the floor and shoot the water.
 - Continue with two guns for 45°, 60°, 75°, 90°, and 0° angles with the floor.
 - Measure in inches the distance the furthest droplet of water goes for each water gun.
- Summarized Data:



- Inform Hypothesis:
 - Do you accept or reject the hypothesis? Why?

Paper Airplane Lab

Students Summarize Data:

- Create a graph to summarize your data. **(SLIDE)**
 - The type of graph you choose should be the best type to communicate your data.
 - Consider if your data might be clearest using:
 - Averages/All data
 - Line graph
 - Pie chart
 - Bar graph

- Each group will need to: **(SLIDE)**
 - Create a graph to summarize their data.
 - Be sure your graph includes:
 - Title
 - Labels on the x and y axis (with units!)
 - Data points

Share Data Summaries:

- Pair up groups: **(SLIDE)**
 - Look over the other groups graph and tell them what their graph communicates to you.
 - Students should see if the graph they chose clearly communicates the outcome of their investigation and if not, what they can do to improve their graph.

Study Time

Study with a Partner:

- Science tells us that studying with a partner can sometimes be helpful: **(SLIDE)**
 - Share flash cards
 - Test your knowledge
 - Motivate you
 - Help fill in gaps in your knowledge

- Pair up with someone: **(SLIDE)**
 - Let them test you using your flash cards.
 - Swap and test them using their flash cards.
 - Let them test you with their flash cards.
 - Test them with your flash cards.

- Have students partner up and test each other with flash cards.

Concept Map:

- We will use the last xx minutes to study with our concept maps.
 - Remember to think about what you missed on the mid-term and to focus on learning those pieces.

- How to study with a Concept Map. **(SLIDE)**
 - Take time to look over your concept map – try to remember your main ideas and the connections between ideas.
 - Cover up a bubble with your hand and see if you can remember what was in the bubble and the ideas connected to that bubble.
 - Turn your concept map over at some point and try to visualize it in your mind. What parts of it do you remember?
 - Spend more time looking over the sections you don't remember.
 - Finally, try taking a blank concept map and fill it in with what you remember.
 - Then take your concept map and compare it to the original to see what you remembered and what you don't.

- Give students time to study their concept maps independently.
 - Remind students they can take a blank concept map to practice with.

Preview Research

Engagement

- Tomorrow will be Day 10 of this program.
 - We have experienced and learned many things over this time.
 - Participated in many field research projects: **(SLIDE)**
 - Sea-level rise
 - Whale Sharks
 - Islas
 - Wetlands
 - Sea Turtles
 - Bird Monitoring
 - Fisheries
 - We have spent time learning in depth about many of the parts of the Science Discovery Process: **(SLIDE)**
 - Explore and Wonder
 - Investigate
 - Analyze
 - Make a Difference
 - We have done our own paper airplane investigation, created a hypothesis, designed an investigation and gathered and analyzed evidence. **(SLIDE)**
 - While it hasn't all been easy, each of you has successfully completed all of that plus much more.
- Take a moment to think back to your first day of the program and answer this question: **(SLIDE)**
 - Has your mindset about being a science leader changed in any way over the last 10 days? Why or why not?
- Tomorrow we will celebrate all your hard work the last ten days! **(SLIDE)**
 - We will spend the morning enjoying nature and relaxing – no science notebooks!
 - We will visit some new places (describe based on determined itinerary)
 - We will return to some of our favorite places (describe based on determined itinerary).

Clean-up

- Review clean-up procedure from yesterday.
- Dismiss students as they are done.
- **Remind mentors to hang back after Know it! Own it!**
 - Review mentor roles for Know it! Own it! portion of the day.
 - (See Know it! Own it! Overview in curriculum for ideas.)

Day 10: Celebrate Success Implementation Agenda

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Field Research	Team Leads
12:25 pm	Return to Field Station - Check student medication back into first aid station	Team Leads
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence -or- Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Siesta	PM Lead 1
2:30 pm	Salud	PM Lead 2
4:00 pm	Know it! Own it!	Field Research Manager & Team Lead 2
6:30 pm	Dinner	Program Manager
7:05 pm	Servant Leadership	PM Lead 1
7:35 pm	Exercise	PM Lead 2
8:30 pm	Sleep Prep	PM Lead 1
9:00 pm	Bedtime	PM Lead 2

Community Building

Day 10

Timing:

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- iPod w/ preloaded music
- Speaker

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).
- Prep supplies for Community Building Activity.

Food & Conversation

Question: What is something you have seen or done in Bahia that you never have before?

Review Community Question:

- (Read today's question out loud.)

Community Building Activity: Curiosity Questions – Career

Overview: This activity is meant to break the ice and let people get to know each other.

Review purpose and expectations:

- Today's activity is: Curiosity Questions.
 - When music plays walk around and mingle.
 - When the music stops partner with the person closest to you.
 - A question will be read.
 - Introduce yourselves and answer the question.
 - If time remains you can discuss the question from breakfast or anything else, you would like to talk about.
 - When the music starts again, thank your partner, and begin mingling again.
 - The next time the music stops you must find a NEW partner.
 - We will repeat this several times.

Activity:

- Start music and allow people to mingle.
- After ~10-20 seconds stop the music and read a question from below.
- Allow pairs 1-2 minutes to talk, then begin the music again.
- Curiosity Questions – Career
 - What is something about you (trait, characteristic, talent, etc.) that make you valuable to someone looking to hire?
 - What do you think is the difference between a job and a career?
 - What is one career you have considered in the past or are considering for yourself? What makes you interested in that career?
 - What would a typical day look like for you 10 years from now?
 - What is at least one experience you had/want to have before you start your career?

Debrief:

- Potential questions:
 - What is one thing you learned about another person today?
 - What is something you learned you have in common with another person?

Morning Announcements:

- Review daily schedule and any boat/snorkel groupings.
- Review gear for the day:
 - Wear: a swimsuit, water shoes or closed-toed shoes, hat, sunglasses, short/long sleeves.
 - Backpack: Science notebook and pencil, towel (optional)
 - Fill and bring a water bottle.
 - Snorkel gear & wetsuit
 - Apply sunscreen.
- Ask Facilities Manager if they have any updates to share.

Field Research
Celebrate Success!

Overview

Location:

- TBD

Supplies:

- All Supplies on **General Field Research Supplies Check List**
- TBD based on agenda

Timing:

Time	Activity/Location	Breakdown
7:15 – 8:00AM	Prep & Transportation: Field Station	7:15 – 7:25AM: Students Prep for Field 7:25 – 7:35AM: Gear Check 7:35 – 7:50AM: Drive to Boat Ramp 7:50 – 8:00AM: Park, Unload & Final Gear Check
8:00 – 12:00PM	Field Research: Field	TBD*
12:00 – 12:25PM	Return to Field Station	12:00– 12:15PM: Load Vans & Return to Field Station 12:15 – 12:25PM: Unload & Rinse Gear

Overview of Celebrate Success Day (Instructors Only):

This is not a research project but rather an opportunity for students to celebrate the hard work they have been doing this week. This will also be their last boat trip of the program. Be sure to hype up the students and stress that this trip is a reward for all the hard field research they have been a part of over the last 10 days.

*The agenda for this day will be determined during the curriculum meeting the day before.

Self-Reflection

Day 10

Supplies:

- Rules for Writing (1/student)

Rules for Writing

- Have students take turns reading the rules out loud.

Writing Prompt

- As scientists you have investigated by looking up close and exploring the world around you. Write about your discoveries.
- Each prompt will be announced as you write, and just keep writing and incorporate the new prompt as you go. There will be three prompts.

Writing

- Prompt 1: **This is what I have discovered in Bahia...** [3 mins]
- Prompt 2: **This is what I discovered about myself...** [2 mins]
- Prompt 3: **This is what I am wondering...** [3 mins, 1 min warning]

Peer Editing

- Today we will be peer editing.
- Editing is about making a piece the best it can be.
- You will each be an editor, and the requirement for an editor is to first believe in the possibility of every piece of writing.
- Today you will be reading another person's writing and helping to make it the best it can be. You will do that by giving the person who wrote it a bit of feedback on their writing.
- As an editor there are three things you should look for in a piece of writing:
 1. What do you like about the piece?
 2. Where were you confused or had questions?
 3. What do you want to know more about?
- These are the three things you will give feedback on.
- When you receive someone's work take the following steps:
 - Read through the entire piece without stopping one time. This will allow you to get the idea of what the piece is about.
 - When you read through it a second time you will use three different marks:
 - Place a star next to things you like in the piece.
 - Put a "?" next to anything you are confused about or had questions about.
 - Put a "!" next to anything you want to know more about.
- Review Be Your Best Self.
 - Be curious: Read another person's story. Get into their shoes and learn something new about someone.

- Be respectful: Read carefully and with interest. Be ready to share your thoughts as an editor.
- Be safe: Emotional safety is important. Sharing a reflection is sharing a piece of yourself. As a family it's important that we create a safe space for sharing. Give encouragement. Thank the person for being vulnerable and taking a risk and sharing their work with you.

Students Peer Edit

- Pair up students for peer editing.
- Give students time to read and jot down notes to share as an editor.

Feedback

- Explain that students will be sharing their feedback with each other.
- Explain that the student receiving the feedback should feel free to jot down any notes from their editor as they may use this feedback if they chose tomorrow to improve their piece.
- Remind those sharing feedback to give feedback on all three points.
- (Allow students time to give feedback to each other.)

Know it! Own it!
Day 10

Logistics

Supplies

- Laminated Index Cards with #1-25
- Vocabulary Stickers (1/student)
 - Communicate
- Application of Science Discovery Process – Day 10 (1/pair of students)
- Chart Paper (1/3 students)
- Sharpies (1/3 students)

Set Up

- Cut Application of Science Discovery Process slips up.
 - Make 1A and 1B separate slips of paper.
 - Make Modify for Sharing with the Public a separate slip of paper.
- Create example presentation on chart paper (see curriculum below).

Timing

Time	Activity/Location	Breakdown
35 minutes	Science Discovery Process In-Depth	4:00 – 4:05 Preview Knowledge 4:05 – 4:15 Communicate 4:15 – 4:35 Application of Science Discovery Process
60 minutes	Paper Airplane Lab	4:35 – 4:45 Paper Airplane: Communicate 4:45 – 5:35 Prep for Presentation
25 minutes	Study Skills	5:35 – 5:40 Intro 5:40 – 6:00 Study Time
25 minutes	Research Preview	6:00 – 6:05PM: Engagement 6:05 – 6:15PM: Museo Intro 6:15 – 6:20PM: Notebook Prep 6:20 – 6:25PM: Clean-up

Lesson**Science Discovery Process In-Depth**Preview Knowledge

- Have students take out SDP Concept Map from their folder.

- Preview Knowledge. (**SLIDE**)
 - Ask students what they already know about the Science Discovery Process.
 - Today we will start on “Communicate”.
 - Ask students what they think “Communicate” means?

- Begin Communicate (**SLIDE**).
 - Define Communicate: share or exchange information, news, or ideas.
 - One of the most important things as a science leader is to share what you learn with others.
 - Focus on “Share with Others”.
 - Have students:
 - Write “Communicate” in bubble.
 - Write “Share with Others” in communicate bubble.

Communicate

- Why is it important to Share with Others?
 - Science leaders have a responsibility for sharing what they learn with others.
 - When science leaders share what they have learned it allows other to evaluate the information for themselves.
 - Scientists may choose to repeat an experiment to confirm the results or they may try to build on the findings to learn something else.
 - When scientists share their research with the wider scientific community it can lead to new ideas and connections that can take the research even further.
 - Often science research can help make the world a better place by improving human lives or solving problems that face our planet- those ideas need to be communicated.
 - Example:
 - A science leader has observed an increase in the number of paint manufacturing plants along the river in their hometown. Many of the chemicals used to make paint are toxic. The science leader wonders if any of these chemicals are making their way into the water. They decide to research the question: Are the increasing number of paint manufacturing plants impacting the water quality in the river?
 - Why do you think it would be important for the science leader to share with others what they learn?

- What ways do science leaders communicate?
 - Journal articles
 - Presenting at science conferences
 - Public policy
 - Sharing results with government agencies, testifying before congress, etc.
 - Education – presenting at schools, colleges, etc.
 - Events – festivals, fairs, community events, etc.
 - Popular Media
 - Magazines, newspaper, blogs, social media, etc.
 - Science leaders need to be able to communicate their work to people in a way that they can understand it.

- Example #1
 - (Hand out papers with 1A to half the class and give the other half papers with 1B.)
 - Ask students to read the paper they have been given and in a moment you will ask a couple of questions.
 - Questions: (**SLIDE**)
 - How do smaller molecules pass through the cell membrane?
 - How do larger molecules pass through the cell membrane?
 - Why was it easier for some people to answer these questions?
 - (Have students switch papers to read the opposite version.)
 - Look at both versions together. (**SLIDE**)
 - Question: Which is easier to understand? Why?
 - Is there a time and place for 1A?

- How to communicate (**SLIDE**)
 - When communicating it is important to:
 - Explain why the research is important.
 - Use the language that is familiar to the audience and on a level that will be able to engage with.
 - Other science leaders
 - College students
 - General public
 - Kindergarteners, etc.
 - You would present differently to each of these groups.
 - Provide visual representations when appropriate
 - Graphs of data, tools, etc.
 - Be clear about what the data showed.
 - Explain how what they learned could be used to make a difference.

 - Example #2

- Pair students up.
 - Give each pair a “Modify for Sharing with the Public” slip of paper.
 - Work together to modify this information to be shared with the public.
- Give students time to work- then come together to share out.
 - What did you change? Why?
 - Were you able to understand the information as is?
- Hand out Communication vocabulary sticker.
 - Have students add this to their SDP Concept Map next to “Communicate” bubble.

Paper Airplane Lab

Paper Airplane: Communicate

- Students will prepare a short presentation to share with the class what they learned from their paper airplane investigation. (**SLIDE**)

- Presentation need to include the following: (**SLIDE**)
 - Question
 - Hypothesis
 - Investigation Design
 - Evidence
 - Analysis
 - Trends/Patterns and Outliers
 - A visual representation of your evidence
 - How your evidence informed your hypothesis
 - Making a Difference
 - How what you learned could be used to make a difference.

- Each presentation will include a piece of chart paper showing important information about your investigation.
 - (Show example.)

- All groups will be given a worksheet to prepare for the presentation. (**SLIDE**)
 - Use this to detail out everything you need to share and decide what will go on your chart paper.
 - Use your science notebook notes from the paper airplane labs to help you.

- Review Communication Skills (**SLIDE**)
 - During your presentation focus on:
 - Speaking slowly and clearly
 - Taking up space
 - Using a strong voice
 - Congruent hand gestures.
 - Whenever possible it is important to more your hands in an authentic manner.
 - It can be distracting when someone keeps their hands awkwardly at their sides the entire time.
 - Therefore, it is important to practice moving your hands a bit when presenting.
 - Don't want to go to big and bold.
 - Hand gestures should make sense
 - Using your hands to point at relevant things.

- Consider what you can point at on your chart paper.
- All members of your group must be part of the presentation.
- Order of events (**SLIDE**)
 - Fill out worksheet.
 - Get worksheet approved by a Team Lead.
 - Create your visual.
 - Practice your presentation.

Prep for Presentation

- Hand out “Student Communication Presentation” document (1/team of students).
- Assign mentors to work with each group.

Study Time

Introduction

- Explain that study time will be more independently driven from this point forward.
 - You will have 20 minutes of study time.
- Options include: (**SLIDE**)
 - Creating more flash cards
 - Adding to your concept map
 - Studying flash cards independently or with a partner
 - Asking an expert
 - Studying concept maps
 - Combination of the above
 - Example: Make flash cards for 10 minutes, then study flash cards with a partner for 10 minutes.
- Students determine how to use Study Time (**SLIDE**)
 - Check in with your mid-term reflection.
 - Decide how to spend your 20 minutes.
 - Example #1
 - 10 minutes – create new flash cards
 - 10 minutes – study flash cards with a partner
 - Example #2
 - 10 minutes – Ask an Expert – clarify replicates
 - 10 minutes – study flash cards independently
 - Write you plan in your science notebook.

Study Time

- Give students study time.
- Check in on their plan and execution of plan.

Preview Research

Engagement

- Show picture of example museum exhibit. **(SLIDE)**
 - American History Museum
 - Exhibit on Pop Culture

- Ask students:
 - What appeals to you about exhibit?
 - What could be improved?

- Museums are another way information can be communicated.
 - Each exhibit in a museum is created to communicate some knowledge to the public.
 - Just like when you are thinking about presenting your information it is important to consider your audience, the same is true for museum exhibits.

- Tomorrow we will visit a museum here in the town of Bahía de los Angeles.

Museo Introduction

- Museo **(SLIDE)**
 - The Museo de Naturaleza y Cultura is small local museum in the town of Bahía de los Angeles.
 - The Museo is open to the public and shares information about the history of BLA, the natural resources of the area, and the native people of the area.
 - There are many exhibits inside and outside the museum including full whale skeletons, artifacts from native people, and a shell collection with hundreds of shells, just to name a few. **(SLIDE)**

- Carolina Espinoza **(SLIDE)**
 - Founded the Museo in 1988 and is the current director.
 - She has lived in Bahía de los Angeles for over 48 years.
 - She has seen the town grow from a population of 400 people to over 800 people.

- Communicate **(SLIDE)**
 - We will be focused on the “Communicate” portion of the Science Discovery Process tomorrow.
 - Looking in detail at some of the Museo exhibits to determine what they are communicating and how they are communicating it.

- Exhibits **(SLIDE)**
 - When exhibits are designed several things must be considered:
 - Who is the audience?

- Information must be communicated in a way your audience can understand.
 - What is being communicated?
 - Be clear about what you want to share with people and include only the relevant details.
 - How does this relate to people's lives (make a difference)?
 - Explain to people why it is important they care about this subject.
 - How is the exhibit grabbing and holding people's attention?
 - Colors, visuals, touch, sound, etc.
- Visit
 - You will explore the Museo in small groups. (**SLIDE**)
 - Must hit exhibits: Wetlands exhibit, Whale shark exhibit, Shell exhibit
 - You will focus on answering the below questions about each of those exhibits: (**SLIDE**)
 - What is being communicated?
 - How does this relate to people's lives?
 - How is this exhibit grabbing people's attention
 - What would make this exhibit even better?
 - You will write about two of the exhibits in your science notebook and simply talk about the third.
 - You will have additional time to look at the other exhibits.
 - There are exhibits inside and outside the Museo.
- Servant Leadership
 - While at the museum we will also be participating in Servant Leadership.
 - It will be an opportunity for us to give back to the community of Bahia de los Angeles who have welcomed us these past two weeks and spent time helping us to learn about how the science discovery process works by inviting us to participate in their science research projects and letting us look through the Museo.
 - We will be helping the museums director, Carolina Espinoza, by doing some light cleaning.
 - Remember that you are representing Ocean Discovery Institute today and to Be Your Best Self! Even if you aren't excited about cleaning today remember this is a chance to give back to the community, give 110% on whatever task you are assigned!

Notebook Prep:

- Prep Science Notebooks (SLIDE):

Science Notebook

Communication: Museo	
Exhibit Name _____	Exhibit Name _____
What is being communicated (main idea)?	What is being communicated (main idea)?
How does this relate to people's lives?	How does this relate to people's lives?
How is this exhibit grabbing people's attention (color, visuals, touch, etc.)?	How is this exhibit grabbing people's attention (color, visuals, touch, etc.)?
What would you add to make this exhibit even stronger?	What would you add to make this exhibit even stronger?

Clean-up

- Review clean-up procedure from yesterday.
- Dismiss students as they are done.

Day 11: Museo
Implementation Agenda

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Field Research	Team Leads
11:00 am	Return to Field Station - Check student medication back into first aid station	Team Leads
11:10 am	Prepare for Community Celebration	Field Research Manager
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence -or- Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Siesta	PM Lead 1
2:30 pm	Salud	PM Lead 2
4:00 pm	Know it! Own it!	Field Research Manager & Team Lead 1
6:30 pm	Dinner	Program Manager
7:05 pm	Servant Leadership	PM Lead 1
7:35 pm	Exercise	PM Lead 2
8:30 pm	Sleep Prep	PM Lead 1
9:00 pm	Bedtime	PM Lead 1

Community Building

Day 11

Timing:

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- White board + easel (2)
- White board markers (4)
- White board eraser (2)

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).
- Prep supplies for Community Building Activity.
 - Set up whiteboard easels in the quad with ~ 6 feet between boards.

Food & Conversation

Question: What are excited to tell your family about when you get home?

Review Community Question:

- (Read today's question out loud.)

Community Building Activity: Team Building – Win! Lose! Or Draw!

Overview: Teambuilding fun!

Introduction:

- Today we will play Win! Lose! Or Draw!
- Directions:
 - Each group will select one person from their group to come up the board and draw.
 - The two people who are drawing will be shown the same word that they must draw and get their team to guess first.
 - The people in their group will call out answers as they draw.
 - The first group to guess correctly first gets a point.
 - Use images only – you can't write any words or numbers on the board.
 - Drawers cannot speak, make sounds, or use body language.
 - Any team who breaks the rules is disqualified for that turn.

- Grouping:
 - Each group will consist of the students, staff, and mentors in their field research group, additional adults should spread themselves out evenly amongst these groups.

Activity:

- Have staff, students, and mentors divide into their field research groups and sit around one whiteboard and easel.
- Give each group 30 seconds to nominate a drawer.
- The drawers from each group will meet with the IPM behind the easels to see the word they will be drawing.
 - Everyone is drawing the same word.
- Allow all drawers to return to their whiteboard.
- IPM yells “Start!” and the drawers can begin drawing.
- Once the word has been guessed by one team, the point goes to that team and the drawers return to their team.
 - IPM determines winner of each round.
- A new drawer is selected for each team and the process is repeated.

Win, Lose, or Draw Words:

- Science leader, Glendale Field Station, research, anemone, ponga, snorkel gear, siesta, salud, snorkeling, dinner, octopus, growth mindset, etc.

Morning Announcements:

- Review daily schedule and any boat/snorkel groupings.
- Review gear for the day:
 - Wear: closed-toed shoes, hat, sunglasses, short/long sleeves.
 - Backpack: Science notebook and pencil.
 - Fill and bring a water bottle.
 - Apply sunscreen.
- Ask Facilities Manager if they have any updates to share.

Field Research
Museo

Overview

Contact: Carolina Espinoza (Bahía de los Ángeles)

Research Location:

- El Museo de Naturaleza y Cultura (Museo)

Supplies:

- All Supplies on General Field Research Supplies Check List (see above)
 - o No Umbrellas

Timing:

Time	Activity/Location	Breakdown
7:15 – 8:00AM	Prep & Transportation: Field Station	7:15 – 7:25AM: Students Prep for Field 7:25 – 7:40AM: Gear Check 7:40 – 8:00AM: Drive to Research Location
8:00 – 10:30AM	Field Research: Field	8:00 – 8:10AM: Park & Unload 8:10 – 8:30AM: Introduction & History of Museo 8:30 – 9:35AM: Field Research/Explore Exhibits 9:35 – 10:35AM: Servant Leadership/Clean Museo 10:35 – 10:45AM: Thank you & Load Vans
10:30 – 10:50PM	Return to Field Station	10:45 – 11:00AM: Drive to Field Station & Unload

Overview of Research (Instructors Only):

Students will visit the Museo de Naturaleza y Cultura to consider a way that science is communicated – through museum exhibits. Ocean Discovery has worked with Carolina and the Museo since 2004 helping to create and update exhibits and do hands-on learning with the community.

Field Research

Introduction & History of Museo

- This will be done by Carolina Espinoza

Explore Exhibits

- Students explore the Museo in their mini-research groups (1 adult + 2-3 students).
 - o Must hit: Wetlands, Whale shark, Shell exhibits
 - o Focus questioning on how exhibits are used to communicate research to the public.
 - Why do you think this information is important for people to know?
 - What do you like about this exhibit?
 - What would you do improve this exhibit?
 - What is one question this exhibit makes you think?
- Students must choose TWO exhibits to reflect on in their science notebook.
 - o Let students simply look over the exhibit for a few minutes.
 - o Then have student sit quietly and fill in their science notebook page based on the exhibit.
 - o Have a short group discussion about the answers to the questions on their science notebook page.
 - o Repeat for 2nd exhibits.
- If you finish filling out and discussing the science notebook page, ask students:
 - o Why do you think museums are important?
 - o What other ways could scientists communicate the things they learn from their research?
 - o Why might having the Museo be important to the people of this community?
 - o Are there museums in San Diego you like to visit or would like to visit?

Servant Leadership/Clean Museo

- Gather all students together remind them they will be participating in some Servant Leadership here at the Museo.
- Remind students that this is an opportunity to give back, that they should be their Best Self and give 110% to whatever task Carolina asks them to do.
- Carolina will assign and describe tasks.

Thank you & Load Vans

- Remind students to walk up and shake Carolina's hand and do a personal thank you before getting into vans.

Prepare for Community Celebration

Supplies:

- Talking Points (cut up by individual student)
- Set of Talking Points (1/adult)
- Index cards (4/student)
- Community Celebration PowerPoint Template

Timing:

- 0:00 – 0:10 Overview
- 0:10 – 0:50 Small Group Practice
- 0:50 – 1:05 Create Index Cards
- 1:05 – 1:25 Small Group Practice

Overview

- Remind students the purpose the community celebration.
 - To communicate what they have learned about the Science Discovery Process.
 - To say thank you to the community of Bahia for making this experience possible.
- Share Science Discovery Process slide assignments.
 - Give students talking points.
 - Read them over.
- Return Thank You talking points.
 - Read over them and make sure what you wanted to share was captured correctly.
 - If you need help with the translation raise a hand.
- Presentation Skills Overview
 - Review and demonstrate presentation skills:
 - Taking up space
 - Strong voice
 - Speaking slowly and clearly
 - Congruent hand gestures.
 - Introduce rehearsing to authenticity.
 - When presenting remember that you aren't reading from your paper.
 - You will want to memorize your talking points.
 - We will practice your talking points many times to prepare for this presentation.

Small Group Practice

- Divide students into the smallest groups possible.
 - Non-Spanish speakers should be in even smaller groups. (1 adult: 2 students)
 - Groups should spread out around the field station to work.

- Focus on presentation skills:
 - Taking up space
 - Strong voice
 - Speaking slowly and clearly
 - Congruent hand gestures.

Create Index Cards

- Students create an index card of bullet points for talking points.
- Just the beginning of the sentence then ...
- Example:
 - Hector thank you for....
 - We will never forget...

Small Group Practice

- Return to groups and practice presentation with index cards.
- Be sure to collect all index cards at the end of practice.

Self-Reflection

Day 11

Supplies:

- Rules for Writing (1/student)

Rules for Writing

- Have students take turns reading the rules out loud.

Writing Prompt

- There will be two prompts.
- I will announce the second prompt and you can keep writing from the first, or pick up the 2nd one when you want
- You will have 12 minutes to write about this prompt.

Writing

- Prompt 1: **This is the story about myself that I have never told anyone before...** [6 mins]
- Prompt 2: **This is the story about myself that I have never told anyone, but I will tell you...** [6 minutes, 2 min warning]

Editing

- Remind students of the peer editing they did the day before.
- As a writer they now have the option to reread their piece and revise by making changes, improvements, and adding to it as they feel most comfortable based on the feedback they received from their editor.
 - For instance they may choose to write more about something their editor was interested in hearing more about.
- Writers must always remember that it is their writing, and to only change what they want to change, but to keep in mind that what an editor wants is for it to be the best it can be.
- The goal of today is to have a final draft of their piece on a separate piece of paper that will be collected and then taken back to San Diego to create your chat books.

Writing

- Start by giving students time (~5-10 min) to make improvements by responding to editors' comments.
- Hand out a blank piece of paper to each student to copy their final version.
- Give students time to copy their final version.

Share out

- If time allows, ask if there are any students who would like to share their piece with the group.

Know it! Own it!
Day 11

Logistics

Supplies

- Laminated Index Cards with #1-25
- Copies of talking points (1/adult)
- Student talking point index cards (created by students)

Set Up

- For selecting groups to present:
 - You will give each group a laminated number, if there are six groups you will need numbers 1-6.
 - Create six pieces of paper, each one with a corresponding number (i.e., #1-6)
 - Place those numbers in a bowl/hat.
 - This is how groups will be randomly selected to present (see Paper Airplane Lab curriculum below).

Timing

Time	Activity/Location	Breakdown
20 minutes	Analyze & Make a Difference	4:00 – 4:20 Analyze and Make a Difference
60 minutes	Paper Airplane Lab	4:20 – 4:40 Final Practice for Presentations 4:40 – 5:10 Presentations 5:10 – 5:20 Growth Mindset Debrief
25 minutes	Study Time	5:20 – 5:25 Introduction 5:25 – 5:45 Study Time
40 minutes	Community Celebration Practice	5:45 – 6:15 Practice Talking Points 6:15 – 6:25 Final Clean-up

Lesson

Analyze & Make a Difference

- This morning when we visited the Museo, we were focusing on how science is communicated and shared with others. **(SLIDE)**
 - Ask students to define communicate. **(SLIDE)**

- Have students open their notebooks to “Museo” page. **(SLIDE)**
 - Groups will be paired up.
 - Each group will review what they wrote/remember for the three exhibits.
 - Wetlands
 - Whale sharks
 - Shells

- Group Share
 - Review some questions for each exhibit.
 - What is being communicated (main idea)?
 - How does this relate to people’s lives?
 - How is this exhibit grabbing people’s attention (color, visuals, touch, etc.)?
 - What would you add to make this exhibit even stronger?

- Make a Difference **(SLIDE)**.
 - Think-Pair-Share
 - Why do you think it is important to have museums?
 - What kind of museums do you think the world needs more of?

Paper Airplane Lab

Final Practice for Presentations

- Today each group will present their paper airplane investigation.
 - It's time to communicate what you have learned after all the work you put in the last 10 days!
- Students practice their paper airplane investigation presentation. **(SLIDE)**
 - During your presentation focus on:
 - Speaking slowly and clearly
 - Taking up space
 - Using a strong voice
 - Congruent hand gestures.
 - A mentor will be assigned to work with each group.

Presentations

- Expectations: **(SLIDE)**
 - When you are presenting:
 - Give 100% effort – this is what you have been working up to.
 - Remember to focus on:
 - Speaking slowly and clearly
 - Taking up space
 - Using a strong voice
 - Congruent hand gestures (visuals)
 - Try to be calm and take your time.
 - Everyone in the room is here to support you.
 - When you are listening:
 - Be your best self.
 - Be ready to give a positive piece of feedback.
 - Ex. Everyone in the group used a strong voice and their graph helped me to understand their investigation.
- Presentation order
 - Give each group a laminated number.
 - Ask for volunteers first.
 - When no volunteers are left – choose a group number of the bowl.
- Presentations
 - After each presentation have all students applaud.
 - Ask 2-3 students + 1 mentor to provide positive feedback for each group.

Growth mindset debrief

- Congratulate students on their presentations.
 - Focus on all the positive feedback.

- Reflect. **(SLIDE)**
 - It is important to take a moment to reflect after an experience like this.
 - Ask all students to open their science notebook to the next blank page in the Paper Airplane Lab section.
 - Write your responses to the questions on the board.

- Pair students up.
 - Share responses to questions.

Study Time

Introduction

- Remind students that the final exam is tomorrow.
 - You will have 20 minutes of study time.

- Options include: (**SLIDE**)
 - Creating more flash cards
 - Adding to your concept map
 - Studying flash cards independently or with a partner
 - Asking an expert
 - Studying concept maps
 - Look over mid-term exam questions
 - Combination of the above
 - Example: Make flash cards for 10 minutes, then study flash cards with a partner for 10 minutes.

- Students determine how to use Study Time (**SLIDE**)
 - Check in with your mid-term reflection.
 - Decide how to spend your 20 minutes.
 - Write your plan in your science notebook.

Study Time

- Give students study time.
- Check in on their plan and execution of plan.

Community Celebration Practice

Practice Talking Points

- Students will practice talking points using index cards only.
 - Focus on presentation skills:
 - Taking up space
 - Strong voice
 - Speaking slowly and clearly
 - Congruent hand gestures.
- Divide students into the smallest groups possible (based on the number of adults).
 - Non-Spanish speakers should be in even smaller groups. (1 adult: 2 students)
 - Groups should spread out around the field station to work.
- Collect student index cards.

Final Clean-up

Teaching note: This is an opportunity to get the classroom as organized as possible for tomorrow's packing.

- Final clean-up for Know it! Own it!
- Break down supply bins.
 - Consolidate:
 - Highlighters
 - Scissors
 - Binder clips
 - Simple calculators
 - Unused index cards
 - Paper clips
 - Extra pencils
 - Throw out trash and wipe out bins.
 - Stack empty bins.
- Give each student their file folder to clean-out.
 - Be sure to keep:
 - Flash cards
 - Science Discovery Process Concept Map (master w/ vocabulary stickers)
 - Mid-term exam
 - Put inside:
 - Mid-term Reflection
- Look over tables and floor – throw out any garbage/paper.

Day 12: Community Celebration Implementation Agenda

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Final Exam Prep	Team Leads
8:00 am	Final Exam	Team Leads
8:30 am	Grading Practical/Community Celebration Practice	Team Leads/Field Research Manager
9:00 am	Reflection on Learning	Team Leads
9:15 am	BELIEVE Survey	Team Leads
9:30 am	Practice for Community Celebration	Field Research Manager
11:00 am	Pack & Clean	Field Station Manager
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence -or- Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Siesta	PM Lead 1
2:30 pm	Cleaning	PM Lead 2
3:15 pm	Favorite Moments	Program Manager

Time	Task	Lead
3:45pm	<p>Set Up Event:</p> <ul style="list-style-type: none"> - Presentation Area: <ul style="list-style-type: none"> o Set up screen, laptop, and projector. o Test PowerPoint presentation. o Set up chairs in rows for presentation. o Set up microphone & speakers for presentation, party music, and Zumba music. - Food & Drink Area: <ul style="list-style-type: none"> o Set up snack area. o Set up drink station. o Set up trash. o Set up food. <ul style="list-style-type: none"> ▪ Make two lines on either side with utensils, plates, napkins, trays of food, and condiments in the middle. ▪ Shara to confirm with Alejandrina that students will serve food. - Outdoor Area (in Quad): <ul style="list-style-type: none"> o Set up Pinata. o Place tablecloths on tables. o Place bug candles at centerpieces and light. o Put out any additional decorations. - Set up Activity Tables (round cement tables) <ul style="list-style-type: none"> o Set out bubbles. o Set out coloring pages & crayons. o Set out tattoos, towels & bowls. <ul style="list-style-type: none"> ▪ Fill bowls with water. 	Field Station Manager
4:30pm	Family Swim	Resident Advisor
5:15pm	Final Community Celebration Practice	Field Research Manager
5:45pm	<p>Ocean Leader Photo</p> <ul style="list-style-type: none"> - Take a photo of all students on the beach 	Resident Advisor
5:50pm	<p>Turn on music.</p> <ul style="list-style-type: none"> - Play music in Spanish for our guests to enjoy. - All students report to their assigned role. 	Field Station Manager Field Research Manager
5:50pm	<p>Greeters and Chatters:</p> <ul style="list-style-type: none"> - Greeters (4) <ul style="list-style-type: none"> o Welcome guests - Food servers (4) <ul style="list-style-type: none"> o Bring items to buffet and assist prep until 6:30pm when food is served. o Keep food covered in foil. - Drink patrol (2) <ul style="list-style-type: none"> o Pour juice into cups on trays. <p>Activity Tables (2/activity)</p> <ul style="list-style-type: none"> - Engage kids in your table's activity. 	Resident Advisor

6:00pm	<p>Guests arrive.</p> <ul style="list-style-type: none"> - Check in with Celeste and get song for Zumba performance & test for performance 	Program Manager
6:30pm	Announce that dinner is ready	Program Manager
6:30pm	<p>Dinner is served.</p> <ul style="list-style-type: none"> - Students in the food server group remove foil and serve from the buffet. - Ensure that the food server group gets a chance to eat dinner 	Resident Advisor
7:10pm	<p>Serve dessert:</p> <ul style="list-style-type: none"> - Cookies on trays and pass out - Cover food so that no flies are on food during presentation 	Program Manager
7:10pm	Students prepare for presentations.	Field Research Manager
7:15pm	<p>Invite guests to move to the classroom for presentation.</p> <ul style="list-style-type: none"> - Turn music off and cue beginning of presentation. 	Program Manager
7:20pm	<p><u>Presentation</u> (see talking points for details) <i>Start PPT (Field Station Manager)</i> Welcome: Shara</p> <p>What we have learned... : Ocean Leaders</p> <p>Thanks You's + Certificates + Gifts: Ocean Leaders</p> <ul style="list-style-type: none"> • <i>Hand out gifts & take photo of each community member</i> <p>Closing: Ocean Leader Mentor</p> <p>Zumba Performance: Celeste</p> <p>Thank You/Pinata: Resident Advisor</p>	Field Station Manager
7:55pm	<p>Pinata:</p> <ul style="list-style-type: none"> - Turn on music - Facilitate piñata 	Program Manager
7:55pm	Bag food into different zip lock & give away	PM Lead 2
8:00pm	<p>Breakdown each event area (assign students and staff):</p> <ul style="list-style-type: none"> - Presentation Area: (xx, xx, xx, xx) - Food & Drink Area: (xx, xx, xx, xx, xx, xx) - Outdoor Area (xx, xx, xx, xx, xx) - Walk around and pick up trash (xx, xx, xx) 	Field Station Manager
8:25 pm	<p>Overview of Departure Day</p> <ul style="list-style-type: none"> - See "Day 13 Implementation Agenda" 	Program Manager
8:30 pm	Sleep Prep	PM Lead 1

Community Building

Day 12

Timing:

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- N/A

Set Up

- Place My Plate poster on easel where people entering the kitchen can see it.
- Write the Food & Conversation Question on the schedule board (see below).

Food & Conversation

Question: Who is someone you've gotten to know during this program?

Review Community Question:

- (Read today's question out loud.)

Community Building Activity: Shout Outs!

Overview: Taking time to recognize when someone else has been brave or overcome a challenge.

Review Purpose of Shout Outs:

- Today is our last program day. This is an opportunity to think about anyone who has gone above and beyond and deserves a shout out.

Directions:

- We will recognize people who have contributed to the team, who have overcome a challenge, have been their best-self, or any other reason someone deserves a Shout Out.
- Remember to use a strong voice, and speak clearly and slowly so that everyone can hear your shout out!
- You can give a Shout Out! to anyone, student, mentor, Glendale Field Station staff, or staff.
- Example:
 - "I want to Shout Out Isabela, because she has gone out of her way to make sure all the cleaning supplies are put away at the end of Chores every day. It helps keep the field station

tidy and helps Alejandrina, so she doesn't have extra work to do after a full day of cooking for everyone. Thanks Isabela!"

- ***Instructor Note: Try to make the example Shout Out! a real Shout Out! for a student if possible.***

Activity:

- Do as many Shout Outs! as you have time for.

Debrief:

- As Ocean Leaders you can shout out another person at any time. There is no need to wait for a special occasion. It's something great we can do for someone anytime we realize they are going above and beyond.

Morning Announcements

- Review daily schedule and any boat/snorkel groupings.
- Reminder new mentors arriving tonight
- Review gear for the day:
 - Wear: water shoes or closed-toed shoes, hat, sunglasses, short/long sleeves.
 - Science notebook and pencil.
 - Fill and bring a water bottle.
 - Apply sunscreen.
- Ask Facilities Manager if they have any updates to share.

Day 12: Community Celebration Curriculum

Supplies:

**supply only needed for Cohort 2*

Final Exam Prep

- Bubble Water (1/student)

Final Exam

- Final Exam (1/student)

Grade Final Exam/Break

- Final Exam Answer Key (6)

Believe Survey

- Believe Survey (1/student)

Practice for Community Celebration

- Projector (1)
- Laptop (1)
- Community Celebration PowerPoint
- Community Celebration Certificates*
- Student talking point index cards (created by students)
- Set of Talking Points (1/adult)

Family Swim

- Biodegradable Soap

Community Celebration

- Disco Lights
- Projector (1)
- Laptop (1)
- Tables (4-6)*
 - Coloring pages table (1)*
 - Tattoos, stickers + bubbles table (1)*
 - Food + utensils (2-4)*
- Community Celebration PowerPoint
- Community Celebration Certificates* (for Cohort 1 just have blank pieces of paper).
- Whale shark coloring pages (30)*
- Sea Turtle Coloring Pages (30)*
- Boxes of Crayons (4)*
- Bubbles (10)*
- Leftover Ocean Animal stickers *

- Jewelry making (?)*
- Fake tattoos (60)*
- T-shirt gifts (2/certificate recipient)*
- Pinata (1)
- Bug candle (6)*
- Lighter (1)*
- Center piece (6)*
- Decorative fish garland*
- Ziplocs (10)*
- Aluminum foil rolls (2)*
- Utensil for serving food*
- Utensils for eating food*
- Plates*
- Napkins*
- Cups*
- Jugs for water and other drinks (3)*

Final Exam Prep

Location: Classroom

Timing:

- 0:00 – 0:05 Introduction
- 0:05 – 0:30 Study Time

Introduction

- Today we will be taking our final exam.
 - You will have the next 25 minutes as a final Study Time.

- Options for Study Time include: (**SLIDE**)
 - Creating more flash cards
 - Adding to your concept map
 - Studying flash cards independently or with a partner
 - Asking an expert
 - Studying concept maps
 - Look over mid-term exam questions
 - Combination of the above

- Students determine how to use Study Time (**SLIDE**)
 - Check in with your mid-term reflection.
 - Decide how to spend your 25 minutes.
 - Write you plan in your science notebook.

Study Time

- Give students study time.
- Half way through pass out bubble water as a treat.
- Check in on their plan and execution of plan.

Final Exam

Location: Classroom

Timing:

- 0:00 – 0:05 Intro
- 0:05 – 0:30 Final Exam

Intro:

- We are about to take our final exam. (**SLIDE**)
 - All feelings are valid (anxious, excited, nervous, calm, etc.).
 - You have done a lot to prepare for this, lectures, concept maps, flash cards, study hall, asking experts, etc.
 - This is how you want to show up for tests in high school and in college – prepared!
- Final Exam format. (**SLIDE**)
 - Multiple choice
 - Short answer (1-2 sentence answer) questions.
 - 13 questions
- Test Taking Tips. (**SLIDE**)
 - Read questions carefully!
 - If you don't understand the directions to something – raise your hand.
 - Take your time – there is no need to rush.
 - If you finish early – check your work.
 - If you forget something or feel like you don't know it, try skipping it and returning to it at the end.
 - When you finish – stay seated and turn your exam face down on your desk, sit quietly until the exam is finished.

Final Exam:

- (Pass out Final Exams + Final Exam: Science Discovery Process.)
- (Set the digital timer for 25 minutes.)
- Tell students to begin.
- (Project the digital timer on the board.)
- When time is up students who are finished can leave students still working can have another five minutes.

Grading Practical/Community Celebration Practice

Timing:

- 0:00 – 0:30 Grading Practical/Community Celebration Practice

Grading Practical (Field Research Manager and Team Leads)

- Grade Final Exams

Community Celebration Practice (Staff and Mentors)

- Students will practice talking points using index cards only.
 - Focus on presentation skills:
 - Taking up space
 - Strong voice
 - Speaking slowly and clearly
 - Congruent hand gestures.
- Divide students into the smallest groups possible (based on the number of adults).
 - Non-Spanish speakers should be in even smaller groups. (1 adult: 2 students)
 - Groups should spread out around the field station to work.
- Collect student index cards.

Reflection on Learning

Timing:

- 0:00 – 0:05 Introduction
- 0:05 – 0:10 Students reflect independently
- 0:10 – 0:15 Pair-Share

Introduction

- In a moment we are going to return your graded final exam to you. **(SLIDE)**
 - When receiving an exam back, it is very important to look it over carefully.
 - Remember to try to avoid looking at your grade with any judgement and think of this as evidence of what you know and what you don't know YET.
 - This is also a time to consider which Growth Mindset tools have been the most effective for you when it comes to preparing for an exam.
 - Any of the tools we have shared with you and worked on can be used in school as well.
- After looking over your Final Exam please answer the questions on the board in your science notebook. **(SLIDE)**
 - What is something you are proud of accomplishing during this program?
 - What is a study skill you have learned that you want to continue to use in school this year?

Student reflect independently

- Let students respond to questions.

Pair Share

- Pair students up to share their responses to the questions.

Believe Survey

Location: Classroom

Timing:

- 0:00 – 0:05 Introduction
- 0:05 – 0:15 Administer BELIEVE Survey

Introduction

- On the board, write today's date.
- Explain to students that they will be taking a brief survey. (**SLIDE**)
 - This survey helps us to learn what you think so we can build the best science experiences possible for you and future Ocean Leaders.
 - There are no right or wrong answers, we just want to know your thoughts.
 - Your answers will stay private and this won't be graded.
 - There are 12 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.
 - Try not to work ahead.

Administer BELIEVE Survey

- Pass out BELIEVE 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.
- Give completed surveys to Program Manager.

Practice for Community Celebration

Timing:

- 0:00 – 0:05 Overview
- 0:05 – 0:45 Small group/microphone practice
- 0:45 – 1:30 Full presentation practice

Overview:

- Talking Point Note Cards (**SLIDE**)
 - Notecards are there to help – not to be read from.
 - Do your best to memorize your lines.
- Thank You Slides (**SLIDE**)
 - Say your thank you.
 - Anne will hand you a frame and gift.
 - Hand frame and gift to each person.
 - If there are multiple gifts and frame (i.e., Mujeres con Alas)
 - Pose for a photo.
 - Step off the stage and back in line.
 - What if my person isn't there?
 - Say your thank you, then say “el o ella no esta pero muchas gracias!”
 - Anne will keep the frame and gift.
 - Step off the stage and back into line.
 - Have all students copy on the back of one notecard. (**SLIDE**)
 - El o ella no esta pero muchas gracias.
 - Review el vs. ella with students.
- Microphone
 - During the presentation we will use a microphone. (**SLIDE**)
 - All presentation skills still apply:
 - Speak slowly and clearly
 - Take up space
 - Use a Strong Voice
 - Congruent Hand Gestures
 - Microphone tips (**SLIDE**)
 - Hold the microphone close to your mouth.
 - Do not pass the microphone until you are completely done speaking

- We will all practice with the microphone in small groups today and then get together later to run through the entire presentation.

Small group/microphone practice

- Break students up into smallest groups possible based on number of adults.
- FRM and Community Relations Manager will be at the microphone.
 - FRM will rotate groups through to individually practice with microphone while other students practice talking points.

Full presentation practice:

- Practice Whole Presentation (include Jo and Shara if possible).
 - Bring students to presentation area to practice.
 - Have students stand in the places they will this evening to present.
 - Project BLA Community Celebration PowerPoint.
 - Run through the whole presentation from top to bottom.
 - Remind students that while they are waiting to face forward and avoid fidgeting.
 - Keep feedback to 1 item/student.
 - Taking up space
 - Strong voice
 - Speaking slowly and clearly
 - Congruent hand gestures.

Favorite Moments & Wishes for the Future

Location: Palapas

Timing:

- 0:00 – 0:30 Favorite Moments & Wishes for the Future

Directions:

- Set up chairs in a circle.
- Introduce Favorite Moments:
 - It's been an amazing two weeks.
 - All of us have experienced new and amazing things, faced and overcome many challenges, laughed, learned, and grown as leaders.
 - Before we leave this amazing place, we want to take a moment to have each person share a favorite memory from the past two weeks with the group.
- Give everyone time to think then facilitate the sharing around the circle.
- If time allows, introduce Wishes for the Future:
 - As each of you has experiences this program in a unique way we would also like for each of you to think about a wish for yourself for the future.
 - Your wish can be about anything but it must be for yourself. It can be about something you learned about yourself here in Baja and want to continue with in the future, it could be a wish for yourself for next year in high school, as wish for your future self in college, a wish for your future self in your career, it could be any wish that you have for yourself.
- Give everyone time to think then facilitate sharing around the circle.

Family Swim

Timing:

- 0:00 – 0:10 Students change into suits and water shoes.
- 0:10 – 0:30 Swim and bathe.
- 0:30 – 0:45 Students exit the water and change for Community Celebration

Directions:

- Have all change into bathing suits and water shoes.
- Assign two students to bring biodegradable soap down to shoreline.
- Bathe and swim.
- When ten minutes remain, have students exit the water, dry-off, and dress in a clean polo and nice shorts or skirt for presentation.

Self-Reflection

Day 12

Supplies:

- Envelopes with student letter from Day 1: Self-Reflection.
- Rules for Writing (1/student)
- Thank You Cards (2/student) + 10 additional
- Pencils (1/student)
- Clipboards (1/student)
- Thank You Speech card (6)
- Whiteboard + easel (1)
- Dry erase marker (1)

Set Up

- Write sentence starters on the whiteboard (see below).

Writing Prompt #1: Letters

Overview:

- You will be receiving the letter you wrote to yourself on Day 1.
 - The letter is where you started.
 - Each day you've explored Bahia and you've learned more about the world and yourselves than you probably expected.
 - Writing is often hard because we worry about saying the right thing, and we worry about what to put on the blank page.
 - Reflection is about learning to not worry about the blank page, but to start with what comes to you even if it feels unrelated to what you thought you were going to write or wanted to say. If you put your thoughts down on the page without spending anytime thinking about what to say, you can let your imagination guide you on how to say it.
 - You can use this skill when you are in college and not sure where to start your research paper, you can use it when writing an email to apply for a job, and you can use it when you are writing a speech to give to your graduating class.
 - Write your first thoughts and feelings. You can go back and edit later. But the truth of what you want to say, what is *your* truth is in those first thoughts, so put them on your page before your mind tricks you into thinking it should be something else.
 - Hopefully, you also came to realize that writing your first thoughts requires bravery, and that anything you put on the page was you being honest and open and willing to share your experience because it is through our stories that we get to know one another, and how the world gains empathy.

- Take a moment to read it over, then I will provide you with the writing prompts for today.
 - (Hand out letters.)
 - (Give students time to read.)

Directions:

- You will write to four prompts. You'll write for a total of 13 minutes, but in the middle you will be given two more prompts.
 - Pick up the next prompt as soon as you want.
 - Finish first one or move right into the 2nd one.
- Remember, just write the first thing that comes into your mind, and let your pen guide you. Write anything—because that's the truth. Be brave.

Writing

- Prompt 1: **This is who I was...** [5 minutes, then without warning give next prompt]
- Prompt 2: **And, this is who I am today....** [5 minutes, then give next prompt]
- Prompt 3: **This is who I will be tomorrow...** [3 mins with 2 min warning near end]

Writing #2: Personal Thank You Cards

Overview:

- Review why we do Personal Thank Yous.
 - Networking is a tool for **Full hearts! Powerful minds!**
 - Networking not only includes introducing yourself but making sure you say thank you after meeting or working with another person.
 - Recognizing that someone else has gone out of their way to spend time or work with you is meaningful. Our mentors all spend time with you here in Baja because they believe in you. They believe that you can be the science leaders of tomorrow.
 - Now is our time to say "Thank You" to them. Thank You's should be personal if possible. Think about the ways that person has interacted with you. Helping you to understand something, sharing their journey to becoming a science leader, taking time to paddle board or snorkel with you, talking with you about things you find challenging, etc.
 - Try to be specific about your experiences with your mentors. It is more meaningful and shows that you are genuinely grateful when you take the time to give a personal thank you.

Directions:

- Everyone will write a personal thank you card for each of the mentors that have been working with you for the last four days.
- There are some sentence starters on the board to help but feel free to write whatever is meaningful to you.
 - One memory I have of our time together is....
 - Something I enjoyed experiencing with you was...

- You taught me...
- You really helped me by....
- Thank you for....
- We will collect these cards and give them to the mentors before they leave tomorrow morning.
- If there is another mentor who wasn't in your group but that you want to write a card for just raise your hand and we will bring you an extra card.

Writing:

- Give 5-, 3- and 1- minute reminders of time left.
- While students are writing:
 - **A student must be selected for each mentor** to give the personal thank you when photo frame and cards are handed over.
 - Once students are selected explain their role, give them the "Thank-You Speech" card and have them fill it out.
 - Practice giving the thank-you speech with your students with a focus on speaking with a strong voice and taking up space.
 - Collect their thank-you speech card and place it with the cards so that the student can have it during the presentation.
- In the last-minute walk around and collect cards.
 - Sort them into a pile for each mentor.
 - Tie cards up in a pretty pile with twine (this will be part of their departure gift tomorrow).
 - Place a yellow sticky note on top of each pile with the mentor's name.

Day 13: Departure Day

Implementation Agenda

Time	Task	Lead
6:00 am	Wake Up	Program Manager
6:30 am	Community Building	Program Manager
7:25 am	Pack up and hit the road!	Program Manager
7:45 am	Transition to BLA to SD Implementation Agenda	

Community Building

Day 13

Timing:

- 6:30 – 7:00AM Food, Conversation & Morning Announcements
- 7:00 – 7:10AM Community Building Activity
- 7:10 – 7:15AM Morning Announcements

Supplies:

- Frame w/ photos (1/mentor)
- Mentor thank you cards (1 pile/mentor)
- Thank-You Speech card (pre-filled out)

Set Up

- Write the Food & Conversation Question on the schedule board (see below).
- Give each student doing a thank you presentation their “Thank-You Speech” card.

Food & Conversation

Question: What will you miss most about Bahia?

Review Community Question:

- (Read today’s question out loud.)

Community Building Activity: Personal Thank You Presentations

Overview: Students will do personal thank you presentations for departing mentors.

Activity:

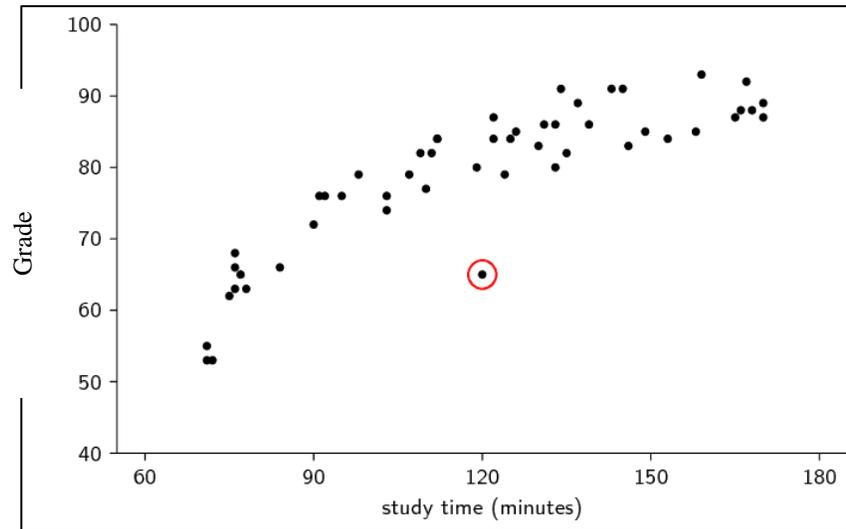
- Have students give their “Thank You Speech” and present each mentor with their framed picture and thank you cards.
- Before students go up remind them to speak in a strong voice and pause before they start and make sure they are taking up space.

Morning Announcements

- Review schedule.
- Ask Facilities Manager if they have any updates to share.
- High-five Tunnel for departing mentors

Exam Materials

7. What would you say about the data point that is circle? Explain your thoughts in 1-2 sentences. (2 points)



Use the below scenario to answer questions #8-9.

A teacher would like to know if using flash cards will increase her students' performance on tests. She decides to have 3 of her 6 classes study with flash cards every day for a week before a test, and have her other 3 classes not study flash cards. She will record the grades of all the students on the test the following week.

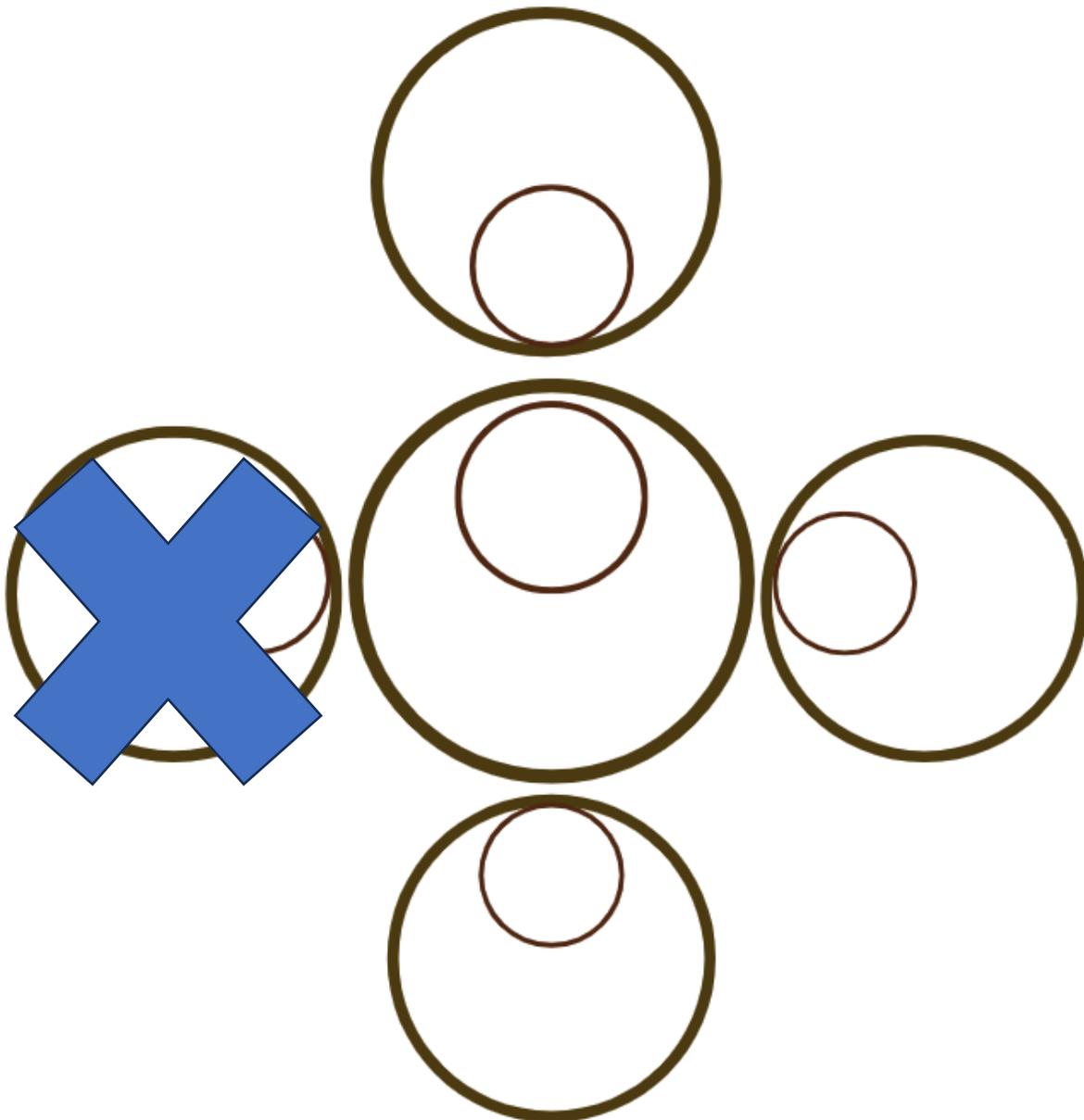
8. Which is the control group? (1 point)
- Both the classes studying with flash cards and those not studying with flash cards.
 - The classes studying with flash cards.
 - The class not studying with flash cards.
 - There is no control group.
9. What is the variable in the above scenario? (1 point)

10. Define bycatch: (1 point)

11. A scientist wants to see if 2nd grade students who have more time at recess are better able to concentrate. She divides a teacher's class in half and gives half the students 15 minutes of recess and the other half 30 minutes of recess. When students finish with recess, they are given a difficult puzzle and the science leaders record how much time (in minutes) they are able to stay focused on the puzzle before giving up.

Write a hypothesis for this investigation. (2 points)

12. Fill in the Science Discovery Process below. (6 points)

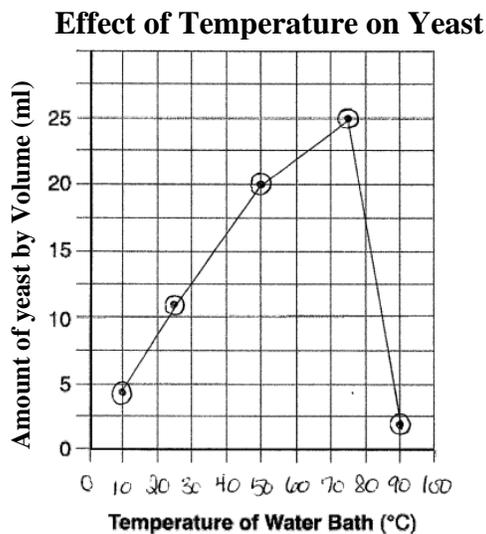


Final Exam

1. Define hypothesis: (1 point)
2. Jessica does an investigation to see fertilizer will make her plant grow faster. She bought “Miracle Grow” brand fertilizer and put the same amount of fertilizer in six identical plants. All plants were put on the same windowsill and watered the same amount each day. She measured the height of each plant in centimeters every day for two weeks.

What is wrong with the investigation she created? (2 points)

3. Describe in 1-2 sentences what the below graph tells you. (2 points)



4. A teacher would like to know if increasing the amount of homework problems each night will increase her students’ performance on tests. She decides to give five extra homework problems each night to 2 of her 5 classes, and ten extra homework problems to the other 2 classes. The 5th class will get no extra homework. She will measure the performance of the students on the test the following week.

Which is the control group? (1 point)

- a) The classes getting 5 extra homework problems
- b) The 1 class getting no extra homework problems
- c) The classes getting 10 extra problems
- d) There is no control group

5. Define Summarize Data (1 point).

6. A bird watcher sees an unusual bird at a feeder. He carefully notes on the bird's color, shape, and other physical features and draws a sketch of the bird in a notebook. What part of the Science Discovery Process did this person just do? (1 point)

- c) A hypothesis c) A question
d) An investigation d) An observation

7. A student performed an investigation to see if feeding mice a vegetarian diet would make grow larger. Her hypothesis was: If I feed mice a vegetarian diet, then they will weigh more. See results in table below:

Days	Average Weight of Mice on Vegetarian Diet (grams)	Average Weight of Mice on Normal Food (grams)
1	30	30
5	32	30
10	33	30
15	35	29
20	35	30
25	37	31
30	38	30

Based on the data would you accept or reject the hypothesis? Explain why. (2 points)

8. A scientist wants to see if climate change is impacting the population of sea lions on three local beaches near his home. He goes to each beach for one hour the 1st Monday of the month for five years and records the number of sea lions on the beach and in the water. Is this: (1 point)

- a) an observational study b) a controlled experiment

9. Define evidence. (1 point)

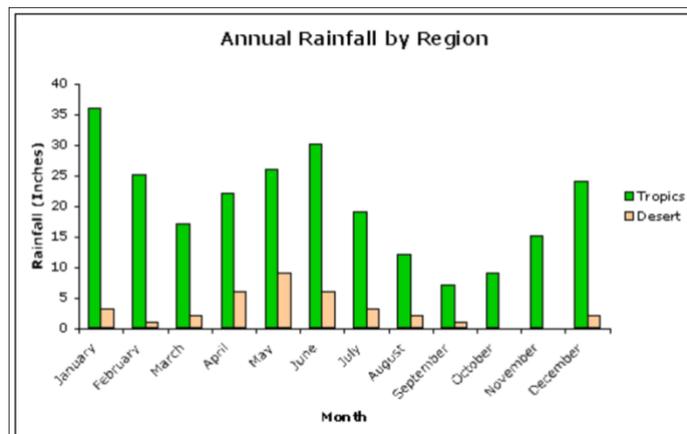
10. A student performed an investigation to see if feeding mice a carnivorous diet (meat only) would make mice grow larger. Her hypothesis was: If I feed mice a carnivorous diet, then they will weigh more. The results of her experiment are shown in the table below.

Days	Average Weight of Mice on Vegetarian Diet (grams)	Average Weight of Mice on Normal Food (grams)
1	30	30
5	32	30
10	33	30
15	49	29
20	35	30
25	37	31
30	38	30

Does any of the data appear to be an outlier? Why or why not? (2 points)

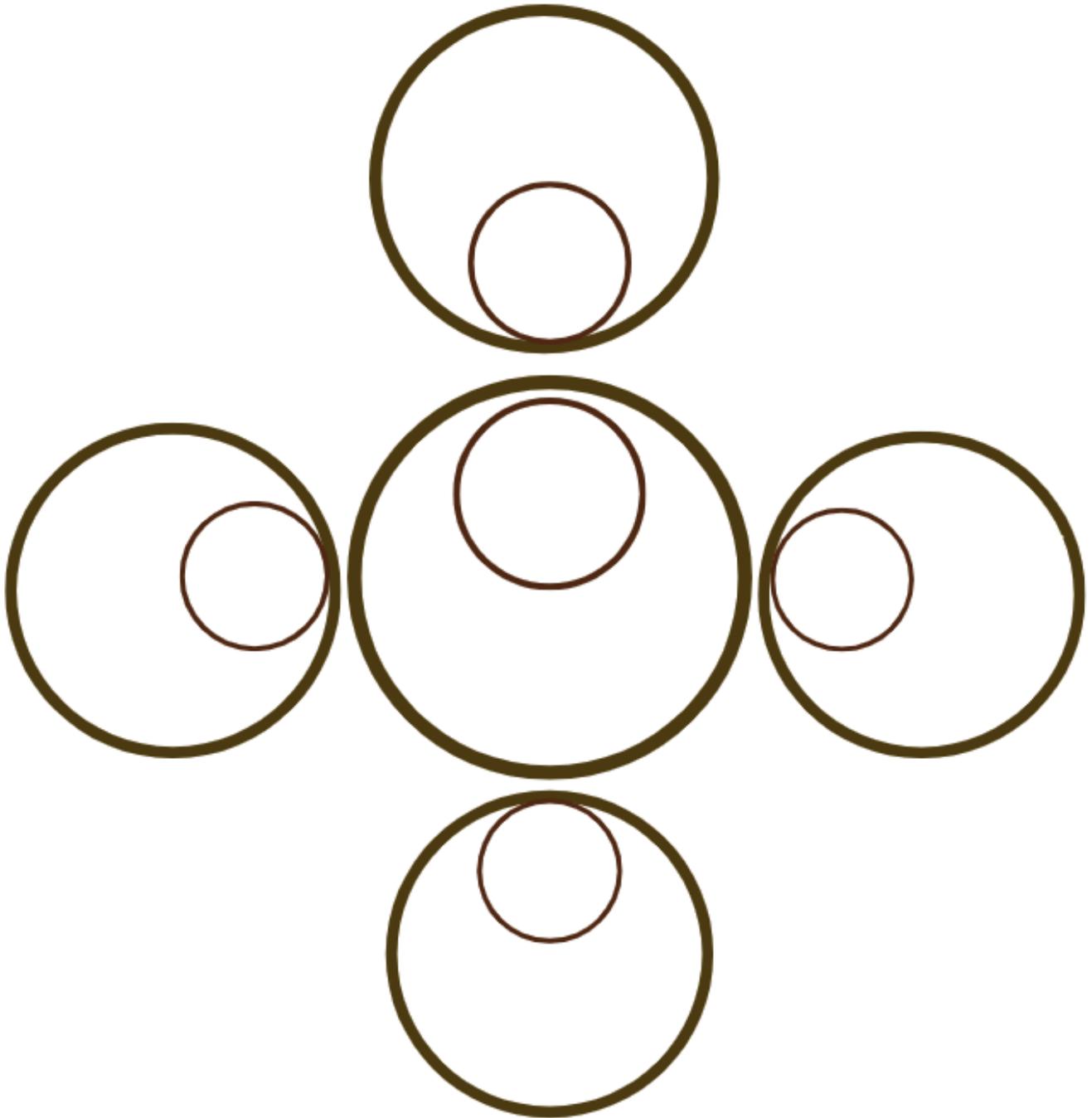
11. Write an example of an observation you made during this program. (1 point)

12. Does the data in the below graph support or not support the hypothesis? Explain why. (2 points)



Hypothesis: If the climate is tropical, then there will be more rain in August through October.

13. Fill in the Science Discovery Process. (8 points)



Appendix

Instructor Resources

Growth Mindset:

- How to implement a growth mindset. ([For teachers](#))

Climate Change 101

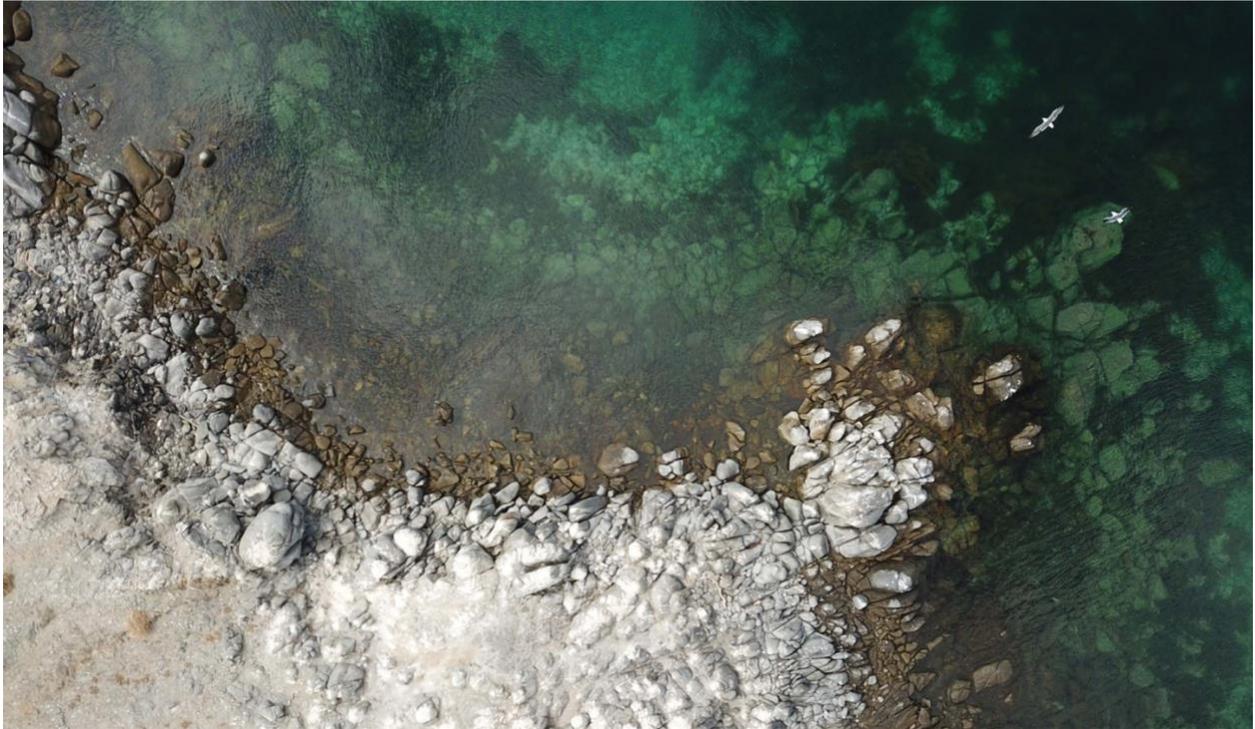
- Video with Bill Nye (4 min): <https://www.youtube.com/watch?v=EtW2rrLHs08>
- Climate 101 (From the Climate Reality Project): <https://www.climate realityproject.org/climate-101>
- 7 Questions about Climate Change You Might be Embarrassed to Ask: <https://www.climate realityproject.org/blog/7-questions-about-climate-crisis-you-might-be-embarrassed-to-ask>
- The Difference Between Weather and Climate: <https://www.climate.gov/news-features/videos/climate-science-101-what-difference-between-weather-and-climate>
- Short paper on climate science in Bahía de los Angeles by Dr. Drew Talley (below)

BAJA WORKING GROUP – CLIMATE SCIENCE ALLIANCE

Key Takeaways:

- Spatial subsidies are a major and ubiquitous determinant of the dynamics and function of diverse systems.
- Islands in the Gulf of California are generally low-productivity habitats immersed in one of the most productive seas on Earth, where marine input can be as much as 22 times the in-situ terrestrial production.
- Neither dynamics nor biodiversity of coastal systems can be understood, or managed appropriately, without knowledge that these systems are extensions of the sea.
- Altered precipitation regimes and warming temperatures threaten to disrupt the pathways of flow from marine to terrestrial systems (and vice versa).

www.climate sciencealliance.org/baja-working-group



What is the focus of your research?

We focus on flows of resources, organisms, and materials among habitats as a key influence on community structure and food web dynamics. Extensive work demonstrates that cross-habitat flux is a major and ubiquitous determinant of the function of diverse systems (e.g., Polis et al. 1996, Talley et al. 2006). The seminal work in this field was research by the late Gary Polis beginning in the 1980's in Bahía de los Ángeles, and continued by collaborators, including these authors, after his tragic death in 2000. While we have continued this work on these islands to maintain an over 30 year-long dataset, we have also extended that reach to include spatial subsidies across other systems, including wetlands. Via a complex food web that connects the ocean and land, terrestrial consumers directly and indirectly use shore carrion, algal detritus, intertidal prey, and seabird products. Marine input (MI) promotes dense populations of several insect taxa, spiders, scorpions, lizards, rodents, and carnivores (3-24x more abundant on the coast and small islands vs. inland areas and large islands).

How do you see climate change impacting the focus of your research?

The impacts of MI on terrestrial ecosystems are controlled, in part, by both environmental (e.g., precipitation, temperature) and biotic (e.g., species-specific) factors. Climate change can alter these mechanisms, both directly (e.g., altering precipitation patterns) and indirectly (e.g., affecting which species are available to use or become subsidy).



ABUNDANT MACROALGAE IN THE WATERS NEXT TO A LOW-PRODUCTIVITY ISLAND.
PHOTO CREDIT: DREW TALLEY

What climate impacts are you seeing?

In the past two decades, there has been a large change in the perennial plant community, including a dramatic decline in a dominant plant, the cholla. This change is not restricted to Bahía de los Ángeles - surveys within a portion of the Pinacate Biosphere Reserve suggest a similar trend there, likely due to extended drought and rising temperatures. Further, one of the biggest drivers of spatial subsidy on large islands is the activity of seabirds, and population growth of some seabird species can decline by as much as 15% in a single year from increased sea surface temperature. This could be exacerbated by the higher frequency of El Niño events expected in the future. Further, changes in the frequency of precipitation pulses may also change the long-term dynamics of the system by alteration of the relative contribution of in-situ vs. allochthonous resources.

What are you most concerned about?

The exchange of materials and organisms across discrete habitat boundaries is a universal phenomenon that occurs across diverse land, freshwater, and marine systems. MI affects coastal communities in many varied habitats, from the tropics, to temperate coasts, to boreal and sub-polar habitats (see Talley et al. 2006, Polis et al. 2004, and references therein). Most obviously and directly, seabird guano, macrophytes and marine animal carcasses subsidize these land communities and allow higher numbers of consumers throughout the web. Subsidized consumers

then interact with their prey and predators to indirectly affect virtually all species in coastal systems. While the changes to these subsidies are more easily recognized where there is a high productivity habitat adjacent to a low productivity one (as in Bahía de los Ángeles), undoubtedly these same impacts occur across all coastal ecosystems. In addition, these dynamics can be extended to other insular systems, such as protected areas influenced by the surrounding landscape (e.g., predatory birds subsidized via scavenging on agricultural or urban areas increase predation pressure on protected areas).

ARGOPORIS APICALIS, A SPECIES OF TENEBRIONID (DARKLING BEETLE), ON ISLA CERRAJA IN BAHÍA DE LOS ÁNGELES. TENEBRIONIDS ARE THE DOMINANT TERRESTRIAL ARTHROPOD ON MANY ISLANDS IN THE GULF OF CALIFORNIA.



PHOTO CREDIT: DREW TALLEY

What are the gaps in understanding that need more research?

We still have little understanding of how geomorphology alters the movement of spatial subsidy; how far inland (and for how long) subsidy effects persist; how retention and identity of shore drift alters MI effects; and how important these effects are at boundaries where there is less pronounced contrast between terrestrial and marine primary production.

What is your plan moving forward to start to better understand or minimize the impacts from climate change?

We will continue to add to our >30 year dataset on plants and terrestrial arthropods in Bahía de los Ángeles, incorporating additional variables related to geomorphology. In collaboration with Comisión Nacional de Áreas Naturales Protegidas, we have begun to use unmanned aerial vehicles (UAVs) to census plant and shore drift dynamics, and we are using similar techniques to those used in Bahía de los Ángeles

to look for similar spatial subsidy effects across other boundaries and habitats. Our current focus is on understanding the complex interactions between island size, bird status, precipitation, and geomorphology to better understand and predict future changes.

Alternate Schedules

Sea Turtle Research w/o Erika

Implementation Agenda

Time	Task	Lead
6:00 am	Wake Up	Program Manger
6:30 am	Community Building	Program Manager
7:25 am	Field Research	Team Leads
12:25 pm	Return to Field Station - Check student medication back into first aid station	Team Leads
12:30 pm	Lunch	Program Manager
1:05 pm	Self-Reflection	Writer in Residence - or- Resident Advisor
	Curriculum Meeting	Field Research Manager
1:45 pm	Prep for Field: Sea Turtle Monitoring - Students get field ready - Wear bathing suits and water shoes. - Bring headlamp or flashlight and a towel.	Team Leads
2:00 pm	Field Research: Sea Turtle Monitoring	Team Leads
6:25 pm	Return to Field Station - Check student medication back into first aid station	Team Leads
6:30 pm	Dinner	Program Manager
7:05 pm	Servant Leadership	PM Lead 1
7:35 pm	Salud	PM Lead 2
8:30 pm	Sleep Prep	PM Lead 1
9:00 pm	Bedtime	PM Lead 1

Field Research Agenda

Time	Activity/Location	Breakdown
2:25 – 3:30PM	Lecture and Prep: Field Station	2:00 – 2:30PM: Lecture 2:30 – 2:40PM: Gear Check 2:40 – 3:00PM: Drive to Research Location 3:00 – 3:20PM: Park & Unload
3:20 – 6:00PM	Field Research: Field*, **, ***	<ul style="list-style-type: none"> • Set up camp (umbrellas, chairs, etc.) • Have students do formal introductions with all Grupo Tortuguero staff and volunteers.
6:00 – 6:25PM	Clean-up & Drive back to Field Station	6:00 – 6:15 Clean-up & Load Vans 6:15 – 6:25 Drive back to Field Station

*Confirm if students will be able to get onto boats to check nets.

**Confirm if students will be able to fill out data-sheets (ours) along-side volunteers.

***Add materials for beach clean-up and maps for tracking returning sea-turtles.

Fisheries Research (Two Rotations of Research)

Field Research Agenda

Time	Activity/Location	Breakdown
7:00AM	Shara & Hector to Set Traps	<p>*This will be done without the students.</p> <ul style="list-style-type: none"> • All traps should have three lights tied on with 2-3 zipties each. • Experimental traps should be labeled with flagging tape at surface buoys.
7:15 – 8:00AM	Prep & Transportation: Field Station	7:15 – 7:25AM: Students Prep for Field 7:25 – 7:35AM: Gear Check 7:35 – 7:50AM: Drive to Boat Ramp 7:50 – 8:00AM: Park, Unload & Final Gear Check
7:50 – 11:20AM	Field Research & Field Trip: Field	<p>8:00 – 9:15AM: Round 1</p> <ul style="list-style-type: none"> • Boats 1 & 2: Collect data w/ Hector • Boats 3, 4 & 5: Field Trip <p>9:15 – 10:30AM: Round 2</p> <ul style="list-style-type: none"> • Boats 3, 4 & 5: Collect data w/ Hector • Boats 1 & 2: Field Trip <p>10:30 – 11:45AM: Round 3</p> <ul style="list-style-type: none"> • All Boats: Wildlife Watching
11:45 – 12:15PM	Return to Field Station	11:45 – 12:00: Return to boat ramp 12:00 – 12:15: Unload, drive back to field station, & rinse gear