



Cabrillo Coastal Learning Experience

Timing:

2 hours & 15 minutes total

Group 1 (2-4 subgroups):

0:00 – 0:10	Welcome from Andrew + bathrooms (9:45-9:55)
0:10 – 0:20	Divide into teams & give team bracelets (9:55-10:05)
0:20 – 1:10	Transect data collection (10:05-10:55)
1:10 – 1:45	Walk to whale watch point and back – NO LIGHTHOUSE (10:55-11:30)
1:45-2:15	Lunch (11:30 – 12:00)
2:15	Load Bus (12:00pm)

Welcome: (10 minutes)

Adapted from Cabrillo National Monument: Our Urban Watershed

Can be done by Cabrillo ranger or Ocean Discovery staff

- (On bus: Welcome students and review community agreements with them)
- (Direct students to traffic circle for introduction to day)
- Today we're going to be using the tools in your back packs to collect data to help you answer the question: **How might climate change affect coastal plants in San Diego in the future?**
- For the safety of both you and the park, we kindly ask that you walk only on designated paths and know that all animals and plants are protected within the park bounds. We are a leave no trace park, so all trash must leave with you. And lastly, please listen carefully to all instructions from team leaders throughout the day and respect your fellow classmates. We want you to have fun as visiting scientists to our park, but safety is always our number one objective.
- Once our safety briefing is complete, you will be divided into your research groups for the day's activities. The classes will be divided into groups of 16 students. Each group will be assigned a certain location in the park where they will be responsible for collecting data.

Believe: (10 minutes)

Groups and bracelet

- Explain we will be working in groups in complete transects
- Pass out team bracelets

Engagement (5 minutes):

- Ok team ____ as we walk to our data collection location, please keep your eyes open and make observations about what you see within Cabrillo National Monument.

- These locations are numbered and called transect lines. Each transect line is a designated 20-meter section of the park that runs along one of our sidewalks.
- Prior to starting any work at your site, the transect tape, a long measuring tape, must be placed starting from Point A and moving to Point B. This measuring tape will help you know where specifically to collect data and where groups after you should come back and collect additional data.
- Each research team will be responsible for a portion of the transect line. For example, team one will have meters 1-5, team 2 will have meters 6-10, and so on. To help us easily quantify and collect our data, we will be using another tool called a quadrat. A quadrat is a frame that contains a known area, usually a square meter. For your purposes, you will build a three-sided frame. To create your quadrat, place each of the sides into the centerpiece that has the “elbows,” or corners that will accept them.
- As a team you will go through and answer all the questions in the app for your first meter. Feel free to use the ***Plant Identification Guide*** to help you find the names of the plants. Enter them by selecting the button to left of each plant name. Remember to do your best to identify all the species within the quadrat.
- We will go over more instructions when we get down to the transects. When you are not collecting transect data, you will get a chance to explore the other parts of Cabrillo National Monument. As we walk around, make sure you have our research question in your mind. What could happen to these plants as the climate changes? Look for differences and similarities between the plants that live here.
- We will now split you up into your research groups. Half of you will begin collecting data, while the other half explores. We will then switch roles and locations after lunch.
- (Divide students into groups and make sure they use the restroom if they need to).

Transect Collection (45 minutes)

Adapted from Cabrillo National Monument: Our Urban Watershed

- (Walk to transect location. Use the following to guide your group through Survey 123 and the transects).
- To begin, we need to lay out our transect tape. I need a volunteer to help me stretch this out starting at point A (flag) and ending at 20 meters.
- We are going to start about by observing our transect. I need everyone to find their own meter along the tape.
- You will sit and take a few minutes to quietly observe what’s going on in your transect line. This means look closely for the following things: what animals or insects are visiting your section, the approximate height of the plants contained in it, if there are a lot of plants, or are they spaced out and sparse? Pro science tip: The quieter you are, the more you will see.
- Now, as a group you will help me answer the questions in the OUW Site Overview portion of the data collection app Survey 123. The first questions are regarding your location, date, time, and transect number. Next, what animals/insect did you notice within your plot? Together you will

reflect on the general plant height, how densely the plants are growing together, and what direction your section is facing. This is called the transect exposure.

- Now we are going to collect today's environmental data, like temperature, humidity, and dew point. We will do this with a device called a Kestrel.
- You will turn the Kestrel on and aim the fan into the wind. The On/Off/ button is the center round button. The Kestrel will start collecting data at this point. You will be able to scroll through options by pushing the left and right arrows. Then we will enter the data.
- We will now divide into 4 smaller research teams. Each team will be responsible for a 5-m section of the transect. You will use the iPods to collect the data in Survey 123.
- We will start by building our quadrats. To create your quadrat, place each of the sides into the centerpiece that has the "elbows," or corners that will accept them.
- One you have built your quadrat, you will place it in the first of your teams 5 meter sections. Start by placing the right 'leg' of the quadrat on the first meter mark of the section you are working on. For example, if your section is meters 6-10, line up the right leg on the six so that you will be collecting data on the square meter between meter 5 and meter 6. Now, slowly, and carefully, push the quadrat into the vegetation until the bottom of the 'U' is parallel with the sidewalk (**Take care not to damage the vegetation**).
- Now you are ready to collect your data on the cover, diversity, and phenology of your plants. Cover and Diversity is where you be identifying the different kinds of plants (diversity) and how much area they occupy (cover). To do this you will need to open the **OYW Transect Data Survey**. Click this survey to begin. It starts with some of the same questions of location, date, and time so we can compare across transects. As a team you will go through and answer all the questions in the app for your first meter. Feel free to use the **Plant Identification Guide** to help you find the names of the plants. Enter them by selecting the button to left of each plant name. Remember to do your best to identify all the species within the quadrat.
- After you identify the plants within the quadrat, we need to estimate the amount of space the plants are taking up within your quadrat. This is called coverage, and you will use the guides on the quadrat to help you make these estimations. The whole quadrat is 1 square meter, which represents 100%. The lines that are marked in the middle of each leg are there as reference points to help you divide the space into fourths. You can think of this as four small squares inside the one-meter big square. Each small square represents 25% of the total. This will help you and your team to estimate how much of the quadrat is filled by plants. The total will be a percentage of the 100% whole. Discuss with your team and choose the appropriate choice on your data sheet.
- The final set of questions will be about plant phenology. This means closely observing the plants and noting where they are in their annual growing cycle. For this portion, you will observe **[insert plants here]**. Select Observation 1 and choose **[species]**. Once you have done this, you will see three other choices appear from the drop-down menu. They are: Are new leaves present, Are any flowers present, and Are any seeds or seedpods present? Look closely at a specific individual plant you have identified and answer the questions to the best of your ability about this single plant. Remember, each plant species flowers at different times in the year, so

this information is important moving forward as we monitor how the plants are adapting to our changing climate.

- We will be here to help you along the way. Remember, as scientists it's okay to mess up. Science is messy! What matters most is what we learn from the process and the questions we ask afterwards. Let's begin our data collection!
- (Walk between groups and assist them as needed. Ask questions about the plants: are they similar to the ones they saw in the classroom? Are there similar or different plants throughout the transect? Etc)

Cabrillo Exploration (35 minutes)

- Walk to students to whale outlook and back. If time, discuss plants you see along the way. Do not go to the lighthouse or museum.
- Thank you all for helping us collect data. The next step in your research, scientists, will be to go to Ocean Discovery's Living Lab later today to look at this data.
- We will analyze what is happening with the plants now, and we will be focusing on how the climate could change and actually affect these plants in the future.
- With your neighbor, I want you to share a prediction you have about the Cabrillo National Monument plants. How do you think climate change could make Cabrillo look different? What effects do you think it will have on the plants?
- It is now time to gather all of our belongings and eat lunch. Then we will head to Ocean Discovery's Living Lab
- —Make sure you are back and starting lunch at 11:30
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Supplies:

- Explore bracelets
- Plant exploration guides (Cabrillo)
- iPods for Survey 123 (Cabrillo)
- Transect tape (Cabrillo)
- Quadrats (Cabrillo)