

Focus: Collecting Data

Grade Level: 8-12

Session Length: 45-60 minutes

Driving Questions

- How can we measure to test the assumptions in our model?

NGSS Links

- Planning and Carrying Out Investigations

Systems Thinking Characteristics

- Identifying Hidden Dimensions of the System

In the fifth session of the Coastal Dynamics program, student project teams take part in a virtual expedition to Crystal Cove State Park's North Beach and help to record data for the three monitoring projects.

After a short introduction to the virtual expedition, project teams explore the North Beach through an interactive Thinglink. As they move around the beach, they meet educators from Crystal Cove and observe the process of collecting data. Students can then record and process data for sand height, which they use to construct a beach profile; wave dynamics; and sediment composition.

Learning Outcomes & Assessments

<i>By the end of this module, students will be able to...</i>	<i>You can assess this using...</i>
1. Describe the process of collecting scientific data for the three monitoring projects.	Class discussion; Field notebook reflection
2. Record and process data for their assigned monitoring project.	Field notebook notes
3. Use sand height data to graph a beach profile, or cross-section, for a transect along the North Beach.	Field notebook notes
4. Reflect on how we can use the data to test the assumptions in our model.	Field notebook reflection

Session Overview

Section	Description	Length	Format
Launch	Erick rick welcomes the project teams to the virtual field expedition during a short video.	5 minutes	Whole class
Explore	Students explore the Crystal Cove Historic District beach virtually through a Thinglink as they help to record data on beach profiles (or sand height), waves, and sediment composition.	30-40 minutes	Individual
Share	Students debrief on their experiences collecting data.	5-10 minutes	Whole class or project teams
Reflect	Students reflect on their experience during Session 5.	5 minutes	Individual

Virtual Materials

- Session 5 Google Slides Presentation: <https://bit.ly/31DmeOu>
- Session 5 Field Notebook template (optional): <https://bit.ly/3m8eBsQ>
- Field Expedition Thinglink: <https://bit.ly/2QW2W4Y>
- Data Processing Webpages:
 - Beach Profiles: <https://bit.ly/3doFV1X>
 - Waves: <https://bit.ly/3djS9sY>
 - Sediment Composition: <https://bit.ly/2QVUd2L>

Each student will need...

- A device with internet access (a computer, smartphone, or tablet will all work!)
- Field notebook and pencil
- A timer or stopwatch

Before You Start Teaching

- Copy over the [Session 5 Slideshow](#) for your chosen platform to your own Google Drive account. Test to make sure that the videos work. (If not, you may have to check the permissions on the Crystal Cove Conservancy Youtube Account.)
- Take a few minutes to explore the Thinglink and the Data Processing resources for each project. Most of the session should be self-guided for students, but you can check to see if there are any parts where you may need to offer specific assistance.

Learning Sequence

Launch

Getting Ready to Collect Data! (5 minutes)

1. Open the [Session 5 Slideshow](#) and play the video on [Slide 2](#) for your class. In this video, Erick will introduce the virtual field expedition that students will take part in during Session 5.
2. After watching the video, move on to [Slide 3](#), where you will find a graphic of the environmental engineering process with a marker pointing at “Collect Data & Validate Model.” Tell students that today, they will be moving onto the next step within the Environmental Engineering Process to collect data that they can use to support their ideas that they incorporated into their model about what might affect the amount of sand on Crystal Cove’s North Beach.
3. Once you’ve gone over the new step in the engineering design process, advance to [Slide 4](#) to give students an overview of what they will do and learn during Session 5.

Explore

Virtual Field Expedition (30-40 minutes)

1. Advance to [Slide 4](#) and play the video. Erick will give the project teams specific instructions for what to expect as they explore the virtual field expedition: As they open the Thinglink, they can click on the image of Erick to be introduced to the Data Collection Thinglink.

By clicking on the different stops, they can participate in helping collect data for one of the three monitoring projects, sand height, wave dynamics, and sediment composition. In each monitoring project, they will find a link that will take them to Crystal Cove Conservancy’s website where they can help record and process data from our most recent data collection day.

2. Once the video is done, move on to [Slide 6](#). Give students any additional instructions and let them access the Thinglink link to begin exploring!

The Thinglink is set up with three stops. At each stop, Erick or Shelbi will introduce the monitoring project there. They'll explain what students will help to collect or measure and why that dataset is important. Afterwards, as students click around the area, they'll receive instructions on how to set up their field notebook to collect data and watch a demonstration of how data is collected. After they've explored the area, a link will take them to the Crystal Cove Conservancy website, where they can help to record data from our most recent monthly data collection event and share it back with us through Google Forms.

The three projects include:

- **Stop #1: Beach Profiles.** At the first stop, students observe how Erick and Shelbi measure the height of sand along transects. They set up their field notebook to record data, watch a demonstration video on the Thinglink and then visit the Crystal Cove Conservancy website to record the sand profile measurements for our most recent data collection day.

Afterwards, students follow instructions on the webpage to graph the data and create a beach profile (or cross-section) of the transect that day. They enter their data and share it with Crystal Cove Conservancy through a Google Form.

- **Stop #2: Wave Dynamics.** At the second stop, Erick introduces how to monitor different aspects of ocean waves. Students set up a table in their field notebook to record data and then watch as Erick demonstrates how to collect data on wave frequency, wave height, and still water depth at the North Beach, and then visit a NOAA website to record data on swell direction (using data from a buoy).

After watching the practice videos, students visit Crystal Cove Conservancy's website to record wave data for our most recent data collection day and report it back to us via a Google Form.

- **Stop #3: Sediment Composition.** Finally, Shelbi shares how Crystal Cove Conservancy monitors sediment composition. Students watch a video showing how we collect a sediment sample, and then observe how to set up a data table in their field notebook and record observations on the sediment grain size, grain type, grain shape, and sediment composition.

Once they've watched the demonstration, students visit Crystal Cove Conservancy's website to analyze the sediment sample from our most recent data collection day, and then report their findings through a Google Form.

3. Give students 25-35 minutes to explore the Thinglink and try out the three data collection projects. This can take place during class time or independently outside of class.

Share

Sharing Our Monitoring Projects (5-10 minutes)

1. Ask students to regroup with their project teams. Open *Slide 7* and ask students to briefly describe what they found during the data collection process for the monitoring projects.

- What data did you help record?
- What did you notice? Was there anything that surprised you?
- What will you need to do next to see if the beach at the North Beach is changing?
- Why do coastal engineers use data? How can data help us validate our models?

2. If there is time, bring the whole class back together. Ask students to briefly recap their experience on the virtual monitoring cruise.

Remind students that our goal is to understand how different factors within Crystal Cove affect each other so that we can see how Crystal Cove's North Beach is changing over time. Invite students to share their thoughts on possible next steps. Elevate ideas that today's data is only one snapshot -- we'll have to look at the extended data set, which has been tracking these same indicators for years, to really see how Crystal Cove's North Beach is changing over time. We can then use that data to test the assumptions in our models.

Reflect

Reflecting on Session 5 (5 minutes)

1. At the end of the discussion, advance to *Slide 8* in the slideshow and play the video, where Erick will recap the experience on the virtual field expedition and then ask students to spend a few minutes reflecting.

2. Move on to the final slide, which will share reflection questions. Ask students to spend five minutes reflecting on their experiences today in their field notebook.

3. Finally, thank the class for their time today. Tell them that when you gather again, they will get a chance to analyze the full data sets to determine how Crystal Cove's North Beach is changing over time!