

**Focus:** Collecting Data  
**Grade Level:** 7  
**Session Length:** 45-60 minutes

### Driving Questions

- How can we collect data to determine what mulch type is best for restoring Moro Canyon?

### NGSS Links

- Planning and Carrying Out Investigations

### Systems Thinking Characteristics

- Identifying Hidden Dimensions of the System

*In the eighth session of Project Crystal Code, student research teams take part in a virtual field trip to Moro Canyon in Crystal Cove State Park to collect data at our mulch research site.*

After a short introduction to the virtual expedition, students explore the Project Crystal Code research site and record data through an interactive Thinglink. Students visit 360-degree images of each mulch plot, which contain clickable icons with images of the measurements for them to record. After, they share their recorded data back with Crystal Cove Conservancy.

### Learning Outcomes & Assessments

<i>By the end of this module, students will be able to...</i>	<i>You can assess this using...</i>
<b>1. Describe</b> the process of collecting scientific data to answer their three research questions.	Whole class discussion; Field notebooks
<b>2. Follow</b> protocols to record measurements and share their data with Crystal Cove Conservancy.	Field notebooks

*Session Overview*

<i>Section</i>	<i>Description</i>	<i>Length</i>	<i>Format</i>
<i>Launch</i>	Kaitlin welcomes the students to the research site during a short video.	5 minutes	Whole class
<i>Explore</i>	Students explore the mulch research site virtually through a Thinglink and record data on mulch decomposition rates and soil moisture.	30-40 minutes	Individual
<i>Share</i>	Students debrief on their experiences and initial observations with the class.	5-10 minutes	Research teams
<i>Reflect</i>	In their field notebook, students reflect on their experience during Session 8.	5 minutes	Individual

## Virtual Materials

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- Session 8 Google Slides Presentation: <http://bit.ly/2NXkCvw>
- Session 8 Field Notebook Template (optional): <http://bit.ly/3bAVJ00>
- Data Collection Thinglink: <http://bit.ly/3pP2C3K>
- Data Entry Sheet: <http://bit.ly/3kqWptJ>

## Each student will need...

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

## Before You Start Teaching

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- Copy over the [Session 8 Slideshow](#) 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. 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.
- Decide how you want students to record data. If they are using physical notebooks, Slide 6 in the Session 8 Slideshow gives instructions on how to set up a data sheet on a piece of paper. If they are not using physical notebooks, you can delete or skip [Slide 6](#).
- Once students collect data, decide how you want them to share the data with Crystal Cove Conservancy. Students can enter their data into a class [Google Sheet](#) that you can send to Kaitlin, or have students send copies of their data sheets directly to you and you can send all the data sheets to Kaitlin.

## Learning Sequence

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### Launch

#### *Getting Ready to Collect Data! (10 minutes)*

1. Open the [Session 8 Slideshow](#) and play the video on [Slide 2](#) for your class. In this video, Kaitlin will introduce the virtual data collection field trip that students will take part in during Session 8.
2. After watching the video, move on to [Slide 3](#), which gives an overview of what students will do and learn during Session 8.

### Explore

#### *Virtual Field Expedition (30-40 minutes)*

1. Advance to [Slide 4](#) and play the video. Kaitlin will give the research teams an overview of what types of data they will help to collect to answer our research questions. Then, advance to [Slide 5](#) which lists the 5 different types of data that students will need to record: (1) plot number, (2) mulch treatment, (3) soil moisture, (4) current mass of mulch bags, and (5) the percent mass loss of each mulch bag.
2. If students have blank physical field notebooks, Slide 6 gives instructions for setting up a data sheet on a blank piece of paper. If you want students to use the optional field notebook template for this session, you can skip this slide.
3. Next, advance to [Slide 7](#), where Kaitlin will introduce the student's task for the day. They will explore the research site virtually on Thinglink through 360 images.
4. Advance to [Slide 8](#) and pull up the Thinglink and demonstrate how to click on one of the plots (which are labeled with numbers). Once you enter the first 360-degree photo, show students how they can use their mouse to scroll around and click on different points of interest to explore the area.
5. At each plot, students will need to record the plot number and the type of mulch on the ground. They'll also need to record two soil moisture readings, and the mass of one woody mulch bag and one straw-like mulch bag.
6. Give students guidance on how many plots you want them to collect data on and how you want them to share the data with you. (Assign students or research teams to collect data on one whole numbered block at a time, each data sheet will contain data from the woody mulch plot, the straw-like mulch plot, and the no mulch plot for that number).

7. Remind students that at the end of the data collection process, we'll be sharing our data with Kendra at UCI, and using it as evidence to support or disprove our hypothesis!

Share

*What Did You Observe? (10 minutes)*

1. When the students are done recording data for their assigned plots, bring the class together again and advance to *Slide 9* with some questions to discuss with the whole class.

- *While you were helping to weigh the mulch bags, did you notice any patterns?*

As students answer, encourage them to share what they noticed. Did one type of mulch bag seem to lose more mass than the other? Were mulch bags in one type of plot losing more mass than the other type of plot? What does it mean if the percent mass loss was higher or lower?

- *While you were helping to record soil moisture data, did you notice any patterns? Could you tell if the soil moisture was higher or lower in a particular type of plot?*

Students may or may not notice different patterns, depending on the data. As a follow up, encourage students to explain what it means if soil moisture is higher or lower in one type of plot. Where did the moisture go? Why might it be lower in a particular area? If there isn't a difference, what does that imply about the mulch?

- *Why do scientists collect data? How can data help us support our claims?*

Elevate ideas about how data is evidence that we can use to prove or disprove our hypothesis. The data we collected today helps us accurately measure invisible parts of the system such as soil moisture levels and decomposition rates.

- *Now that we have collected data, what do we need to do next? How can we see if our hypothesis was supported or not supported by our evidence?*

Once we have collected our data, our next step in the scientific process is to look for patterns in the data. We can do this by creating a mathematical or visual representation of our data set to help us compare our different treatments. Ask students if they have ideas about how to represent the data -- these will be revisited in Session 9.



Reflect

*Reflecting on Session 8 (5 minutes)*

1. At the end of the discussion, advance to **Slide 10** in the slideshow and play the video, where Kaitlin will recap the experience on the virtual data collection field trip 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 which mulch type would be best for land managers to use when restoring Moro Canyon.