Crystal Cove® CONSERVANCY

Module 3: Digging Deeper

Focus: Conducting Background Research
Grade Level: Fifth Grade
Module Length: 90+ minutes

Driving Questions

- What questions do we still have about the model of our ecosystem?

NGSS Links

- 5-LS1-1
- 5-LS2-1
- Planning and Carrying Out Investigations
- Constructing Explanations
- Interpreting Data

Systems Thinking Characteristics

- Identifying System Components & Processes
- Identifying Simple Relationships Between System Components
- Identifying Hidden Dimensions of the System

In this third and optional module of Project Crystal, students define what questions they have about the ecosystem in Moro Canyon, and conduct background investigations to learn more about specific parts of the system.

At the start of the module, students look back at their model created in Module 2, and determine what questions they still have and what they wonder about. Based on the questions that students asked, the teacher can decide to have them conduct background investigations to dig deeper into specific components and processes of the ecosystem in Moro Canyon.

Suggested investigations include how plants use water, how water cycles through the system, the effects of mulch, and the amount of rainfall in Moro Canyon.

Learning Outcomes & Assessments

By the end of this module, students will be able to...	*You can assess this using...*
1. *Share* 3 questions they have about the ecosystem in Moro Canyon.	Science journals
2. *Describe* how plants use water and draw a diagram showing the process of transpiration.	Science journals; Observations of class discussion
3. *Compare* the rainfall in Moro Canyon to other parts of California and their own home.	Science journals, Observations of class discussion
4. *Plan* and carry out their own investigation	Science journals, Observations of class discussion

Module Sequence

Section	Session Title	Length	Format
Launch	***What questions do you have about your model?*** Students look back at their model of Moro Canyon and come up with at least three questions or things that they wonder about their model.	20-30 minutes	Whole class or individual
Explore	***Coming Up With a Plan*** In a group discussion, students share their questions with each other, and plan which questions to investigate further.	20-30 minutes	Whole class or small groups
	Digging Deeper Depending on how the educator chooses to structure this module, students take part in background investigations either independently or in small groups.	30-45 minutes each	Individual or small groups
Share	***Sharing What We Learned*** In a group discussion, students describe the investigations they conducted and share any new or changed ideas they have about the ecosystem in Moro Canyon.	20-30 minutes	Whole class or small groups
Extend	***Explore at Home: Community Interview (Optional)*** Students find a plant expert in their community such as a friend of family member who gardens, cooks, or otherwise has knowledge of plants. They plan and conduct an interview with their expert to learn more about their plant knowledge.	30 minutes	Individual
Reflect	***What is something you learned that you will add to your model of Moro Canyon's Ecosystem?*** Students share their initial ideas for how to update their models.	15 minutes	Individual

Planning This Module

Module 3 is designed to be flexible, based on the time that your class has available and where you see your students having questions related to Project Crystal's disciplinary core ideas. You can decide which background investigations will be most beneficial for students' understanding, or let students choose which questions they want to investigate.

If there are other content knowledge-related learning activities that you want to integrate into the program outside of our curriculum, this is also the best place to do so.

Some possible ways to structure this module:

- Have all students take part in all experiences, whether in class or independently at home.
- Assign different students or student teams to take part in different investigations, and then ask them to report on what they've learned to the rest of the class
- Let research teams or students choose which questions they want to answer and pursue their investigations independently

Virtual Materials

- Module 3 Launch Slideshow: ***http://bit.ly/37n6G57***
- Module 3 Planning Our Investigations Slideshow: ***http://bit.ly/3oSOcPW***
- Module 3 Explore Investigations Slideshows:
  - Transpiration Investigation: ***http://bit.ly/3mlaus4***
  - Plan Your Own Plants and Water Investigation: ***http://bit.ly/38bWE64***
  - Plan Your Own Mulch Investigation: ***http://bit.ly/3nAX2Sp***
  - Moro Canyon Rainfall Investigation: ***http://bit.ly/3qYbW77***
- Module 3 Share Slideshow: ***http://bit.ly/3npe8T5***
- Module 3 Explore at Home Slideshow (English): ***http://bit.ly/34gFxiq***
- Module 3 Explore at Home Slideshow (Spanish): ***http://bit.ly/2ZtMtpq***
- Module 3 Explore at Home Family Directions (English): ***https://bit.ly/3oUVfaP***
- Module 3 Explore at Home Family Directions (Spanish): ***https://bit.ly/3qnPOml***
- Module 3 Reflection Video Prompt:
  Option 1: Flipgrid: ***http://bit.ly/34gQzEy***
  Option 2: Padlet: ***http://bit.ly/2Kua8lG***
  Option 3: Video to host on the private platform of your choice: ***https://bit.ly/388B7v5***

Each student will need...

- Science journal and pencil

Optional Materials for Running Investigations

Each investigation requires different supplies. We've designed them with options that are commonly found at home, so that students can set up and run the investigations independently if need be.

For each investigation, each team or individual will need:

Transpiration Investigation

- (4) plastic cups (alternatively, students can use (4) glass cups, (2) water bottles and (2) plastic bags, or some other container)
- (2) plastic cup lids of (2) small pieces of aluminum foil
- (1) roll of tape
- (1) small package of Vasoline (optional)
- (1) plant clipping (can also use a green, leafy vegetable such as celery, kale, or lettuce)
- (1) 1-cup measuring cup or another small container for pouring water

Plan Your Own Plants & Water Investigation

- (4) plastic cups (alternatively, students can use (4) glass cups, (2) water bottles and (2) plastic bags, or some other container)
- (2) plastic cup lids of (2) small pieces of aluminum foil
- (1) roll of tape
- (1) small package of Vasoline (optional)
- Different plant clippings, depending on the question that students are asking
- (1) 1-cup measuring cup or another small container for pouring water

Plan Your Own Mulch Investigation

- Mulch, leaves, dried grass, or similar
- (2) containers to hold the mulch
- Soil
- Container to pour water

Moro Canyon Rainfall Investigation

- A device (computer, tablet, or smartphone) with access to the internet

Before You Start Teaching

- Before starting the module, review students' models that they created in Module 2. Look for places where students commonly had questions or seemed unsure about processes.

- Review the different background investigations in Explore, and decide how you want to conduct the investigations with your students. These can be conducted at school or at home, and you can assign different investigations to different groups of students, or have them all conduct the same investigations.

- Copy over the ***Launch Slideshow***, the ***Explore Slideshows***, ***Share Slideshow***, and ***Explore at Home Slideshow*** to your own Google Drive account.

- Update the ***Launch Slideshow*** on ***Slide 5*** to include directions for how you would like students to submit questions they still have about their model. You might include a link to a class padlet, a message board, or instructions on how to submit a photo of their notebook page to you.

- Update the ***Explore Slideshow*** on ***Slides 3*** and ***4*** to include any specific directions on how students will conduct the background investigations.

- Decide how you will host the Share discussion for this module. If your class already has established science communication norms, open your copy of the ***Share Slideshow*** and update ***Slide 3*** with your discussion guidelines and ***Slide 4*** with any sentence starters.

- Decide how you want students to share their reflections. They can post their thoughts publicly on Crystal Cove Conservancy's Flipgrid or Padlet, or you can host the discussion prompt video on the platform of your choice. We recommend sticking to the same format as the previous module.

Learning Sequence

Launch

***What Questions Do You Have About Your Model?* (20-30 minutes)**
Slideshow Link: ***http://bit.ly/37n6G57***

In this slideshow, Kaitlin prompts the students to look back at the model they created in Module 2, and come up with at least three questions they still have about their model and the ecosystem in Moro Canyon. They can then submit their questions to help you decide what background investigations to use in the Explore section of the module.

Update ***Slide 5*** of the slideshow with instructions for how they can submit their questions to you. You might include a link to a class padlet, a message board, or instructions on how to submit a photo of their notebook page to you.

This slideshow can be assigned independently or shared with the whole group. Students can look at the Google Slides presentation and watch videos on their own, or you can choose to present it to the whole class.

Explore

Planning Our Investigations (20-30 minutes)
Slideshow Link: ***http://bit.ly/3oSOcPW***

During this short slideshow, students will have the chance to share their questions with each other, and decide which investigations they are going to conduct to help answer their questions. This can be conducted over Zoom or in the classroom, either as a whole class or in small breakout groups. They then set up a table in their science journals to help them keep track of what they learn during each investigation.

Slide 4 lists the possible investigations you can choose from. You can have students choose which investigations interest them the most, or assign them based on the questions submitted from the Launch slideshow. Make sure to update ***Slides 3-4*** with any specific instructions for your class.

Investigations: Digging Deeper into the Ecosystem **(30-45 minutes)**
Moro Canyon Rainfall Slideshow Link: ***http://bit.ly/3qYbW77***
Transpiration Investigation Slideshow Link: ***http://bit.ly/3mlaus4***
Plan Your Own Plants and Water Investigation Slideshow Link: ***http://bit.ly/38bWE64***
Plan Your Own Mulch Investigation Slideshow Link: ***http://bit.ly/3nAX2Sp***

In this series of short investigations, students can dig deeper into specific components or processes of the ecosystem to better understand their models. Each investigation is around 30-45 minutes of active learning, although some include an hour of wait-time in the middle for the investigations to complete.

It is up to you how you want to split the work among students. You could choose to run the investigations together in the classroom, or assign them to students independently from home. You can also decide how many of the investigations you want to run with your class based on what questions students had, what background information you already cover with your class, or what you have the time for.

As students complete each investigation, they should fill in the Digging Deeper chart in their science journal. This will help them keep track of what they've learned so that they can make a plan to update their model later in Session 4.

Share

Discussion: Sharing What We Learned **(20-30 minutes)**
Slideshow Link: ***http://bit.ly/3npe8T5***

Once students have taken part in the Explore investigations, this discussion lets them share what they've noticed and learned about the different components and processes, and discuss how they might improve their models. This discussion can take place on Zoom or in the classroom, either as a whole class or in small breakout groups.

Before diving into the Module 3 discussion questions, you can remind students again of the science communication norms. Suggested norms and sentence starters are included in the Google Slides presentation, although you can edit them or use your own!

Extend

***Explore at Home: Community Interview* (30 minutes)**
Slideshow Link (English): ***http://bit.ly/34gFxiq***
Slideshow Link (Spanish): ***http://bit.ly/2ZtMtpq***
Family Directions (English): ***https://bit.ly/3oUVfaP***
Family Directions (Spanish): ***https://bit.ly/3qnPOml***

During this optional Explore at Home Investigation, students find a family member or friend who knows a lot about plants. These plant experts could be gardeners, people who love to cook, people who know about medical plant uses, nature lovers, or people who carve wood. Students come up with questions to ask their chosen plant expert and conduct an interview to learn more about plant knowledge beyond just the ecological study of plants that we focus on in Project Crystal.

As an extension, you might choose to have students share what they learned with their classmates, either during a small group discussion or by filming a video for Flipgrid or another platform.

Reflect

***Reflection Question: What is something new you learned that you are going to add to your model?* (15 minutes)**
Flipgrid Link: ***http://bit.ly/34gQzEy***
Padlet Link: ***http://bit.ly/2Kua8lG***
Video Link: ***https://bit.ly/388B7v5***

At the end of the module, students reflect on the investigations and their models by sharing something new they learned during the module. Students can share their reflections with the broader Project Crystal community on our public Padlet or Flipgrid pages, or you can host the video reflection prompt on your own discussion platform of choice.