Focus: Explanations & Communicating Information
Grade Level: 7
Session Length: Two sessions of 45-60 minutes

Driving Questions
- Which plant type do we recommend that land managers use to restore degraded plots in Crystal Cove State Park?
- How can we share our research with our community?

NGSS Links
- Constructing explanations
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

Systems Thinking Characteristics
- Identifying Hidden Dimensions of the System
- Proposing Explanations Based on Data
- Thinking Temporally & Making Predictions

In the tenth and final session of Project Crystal Code, student research teams come up with a recommendation for Crystal Cove State Park's land managers based on their findings and design a presentation to share what they've learned.

During the first half of the session, research teams come up with a recommendation for which plant type they think would be the best for land managers in Crystal Cove State Park to use in future restoration projects. They use evidence from their data to support their claim. During the second half, they come up with a plan to share their findings with others and design a presentation to share their findings.

Learning Outcomes & Assessments

By the end of this module, students will be able to...	You can assess this using...
1. Use evidence and reasoning to support a claim about which plant type is best to use for restoration in Crystal Cove.	Field notebooks
2. Use their ideas to design a presentation to share their results with Crystal Cove State Park and their community.	Field notebooks; Student presentations

Session Overview

Section	Description	Length	Format
Launch	Georges introduces the students to their final task in Project Crystal Code: making a recommendation for the land managers at Crystal Cove State Park, and making a presentation to share their findings.	5 minutes	Whole class
Explore	Research teams use their graphs from Session 9 to develop a recommendation backed by evidence about which plant type they think is best for restoration in Moro Canyon	15-20 minutes	Individual
	Next, students decide on a format for their presentation and the content they want to share.	10-15 minutes	Research Teams or Whole Class
	Finally, students design their presentation in the form of a slideshow, a video, a poster, or some other format.	45-60 minutes	Research Teams
Share	Students share their presentations with the class.	Varies	Whole Class
Reflect	In their field notebook, students reflect on their experience during Project Crystal Code.	5 minutes	Individual

Virtual Materials

- *Session 10 Google Slides Presentation*
- *Session 10 Field Notebook Template (optional)*
- *Session 10 Presentation Template (optional)*
- *Stock Photos for Presentations*

Each student will need...

- A device with internet access (a computer, smartphone, or tablet will all work!)
- Field notebook and pencil
- Access to their graphs from Session 9

Before You Start Teaching

- Before beginning the session, review the learning sequence and decide how you want to implement Session 10 with your students. Creating a final presentation is optional but recommended. If needed, you can end the program by having students share their recommendation with Crystal Cove State Park.

- Copy over the *Session 10 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.)

- Decide how you want students to create their final presentations. They could make slideshow presentations, film a video, create a poster, or any other format that you prefer. You can pick one format that you want the whole class to use, or you could leave it up to each research team to decide on their own. Designing a presentation can also take place during class or assigned as independent work.

- Review   the Session 10 Presentation Template. If you want students to use it as a starting point for designing their presentations, copy it over to your own Google Drive account. Update *Slide 16* in the main Session 10 slideshow with a link to your copy of the Presentation Template.

- Decide how you want students to share their presentation. You may want to leave one class period just for presenting or host a virtual after-school event to invite parents and other community members.

  If you feel comfortable with it, we'd also love to join and see student presentations if they take place virtually! Contact Georges by emailing *georges@crystalcove.org* with the date, time, and meeting information, and we will do our best to have someone from Crystal Cove Conservancy or Crystal Cove State Park join your meeting.

Learning Sequence

Launch

Getting Ready to Share Our Findings (5 minutes)

1. Open the *Session 10 Slideshow* and play the video on *Slide 2* for your class. In this video, Georges will introduce the final task in Project Crystal Code: coming up with a recommendation for Lana Nguyen at Crystal Cove State Park and making a presentation to share their findings.

2. After watching the video, move on to *Slide 3*, which gives an overview of what students will do and learn during Session 10.

Explore

Part 1: Developing a Recommendation (15-20 minutes)

1. Advance to *Slide 4* and play the video. Georges introduces students to the first step in making a recommendation: creating an explanation checklist. An explanation checklist is a list of all of the important science ideas that are important for explaining what happened in our research site.

2. Advance to *Slide 5* to get students started on creating an Explanation Checklist in their field notebooks. Go over the example checklist items together, then see if you can come up with three or more additional ideas as a class.

Example ideas include:
- The physical differences between water-spender, water-saver, and non-native leaf-litter.
- How leaf litter affects soil moisture.
- How leaf litter affects decomposition rates.
- How native and non-native plots affect leaf litter decomposition.

3. Once your class has an explanation checklist, move on to *Slide 6* and play the video of Georges. Georges introduces the three-part format that each recommendation should follow.
- *Claim:* Which type of plant they think would be best to use in restoration.
- *Evidence:* The part of their data that supports their claim.
- *Reasoning:* An explanation of the trends they noticed in their data and why they think those trends occurred. This should also mention all of the ideas from their Explanation checklist.

4. Advance to *Slide 7*, split students into their research teams and give them 10-15 minutes to develop their recommendations as a team.

As they work, move between teams as you are able. Encourage students to refer to their data as evidence and to make sure to mention all of the ideas in the explanation checklist in their reasoning.

Part 2: Planning Our Presentations (10-15 minutes)

1. Once the students have come up with their recommendations, bring the class back together to hear about the next step from Georges on *Slide 8*. In this video, Georges introduces the important final step of sharing what we've found. He lets them know they'll be bringing everything they've worked on during Project Crystal Code together to craft a presentation.

2. In *Slides 9-14*, Georges walks the students through a few steps to plan their presentations. If you want the students to all use the same presentation format, you can go through these steps as a class, but if you want to leave it open for each team to decide, you can let research teams work together on their own for each step.
- *Step 1 (Slides 9 & 10):* Decide on an audience. This could be classmates, student's families at home, the Crystal Cove staff, or anyone else!
- *Step 2 (Slides 11 & 12):* What is the most important information to include in the presentation?
- *Step 3 (Slides 13 & 14):* What format will students use to create their presentations? This could be a slideshow presentation, a video, a poster, or anything else!

Part 3: Designing Presentations (45-60 minutes)

1. Once your class or each research team has developed their plan, move on to *Slide 15* and play the video of Georges introducing the last task, to make their presentations!

2. Depending on the class time you have available, you can give the teams time to work on their presentations in class, or assign them to work on it with their teammates as homework.

Slide 16 includes a link to a presentation template that students can use as a starting place for organizing their ideas even if they are using a different format than Google Slides. Make sure to update this link with a link to your own copy of the presentation template.

You can also share with the students a *link to photos* from the Crystal Cove that they can use in their presentations.

Share

Sharing Our Findings (optional) (varies)

1. Advance to *Slide 17.* Depending on the format that students created their presentations in, you can decide on a format for students to share their presentations with each other. You can use a class period to have all the groups share their presentations, and after school virtual event with the student's families, or you could make student videos or posters available for students to look at on their own via your classroom's online portal.

2. We also encourage you to share any student presentations with us! You can send videos, Google Slides presentations, or images of posters to Georges so we can see what your students recommended and share that with the Crystal Cove State Park land managers.

Reflect

Reflecting on Project Crystal Code (5 minutes)

1. At the end of the discussion, advance to *Slide 18* in the slideshow and play the video of Georges thanking them for helping with Project Crystal Code, and asking them to reflect on their experiences for the whole project.

2. Advance to *Slide 19*, which will share reflection questions. Ask students to spend five minutes reflecting on their experiences in their field notebook.

3. Congratulate the students on making it all the way through Project Crystal Code, and thank them for all of their hard work throughout the project! Let them know that the staff at Crystal Cove Conservancy and the land managers at Crystal Cove State Park will be able to use what they've learned to help better restore native habitats in the future.