

Marine Protected Area Exploration Field Notebook

Your Name

Date



Session 1: Exploring the Crystal Cove SMCA

Virtual Exploration

As you explore the [Crystal Cove SMCA Thinglink](#), respond to the questions below. When you're done, share your thoughts with your research team.

1. Which perspective resonated with you the most? Why?
2. What challenges are threatening the Crystal Cove State Marine Conservation Area?
3. Do you think it's important to protect the Crystal Cove State Marine Conservation Area? Why or why not?
4. What questions do you have about the Crystal Cove State Marine Conservation Area? What do you think you need to know in order to help protect it?

Session 1: Exploring the Crystal Cove SMCA

Taking Time to Reflect

In your field notebook, take a few minutes to reflect on your experiences during Session 1.

1. What did you do during Session 1?
2. What did you learn? How did your thinking change?
3. Do you personally think it is important to protect places like the Crystal Cove State Marine Conservation Area? Why or why not?
4. What questions do you still wonder about?

Session 2: Asking Questions About MPAs

What Happened to California's Sardines?

As you look at the graph and photos in Slides 5-6 of the [Session 2 slideshow](#), respond to the questions below.

1. On Slide 5, what does the graph show? What is the connection between the graph and the photos on Slide 5 and 6?
2. Why do you think California's sardine population crashed in the 1960s?
3. How might have the crash of the sardine population affected people who worked on fishing boats or in the canning industry? How might it have affected the price of sardines? The marine ecosystem?
4. What could we do to prevent this from happening?

Session 2: Asking Questions About MPAs

Brainstorming Questions

With your research team, brainstorm any questions that you have about California's Marine Protected Area system. Record your questions below.

Our Questions

Once you're done brainstorming, choose the 4-6 questions that you think are most important or most intriguing. Highlight or add a star next to them.

Session 2: Asking Questions About MPAs

How did different stakeholders feel about the Marine Life Protection Act?

Select an article or video from the list below. Use it to practice conducting a lateral search!

- [The California MPA Network: Safeguarding an Underwater Wilderness](#)
- [California Tribes Peacefully Take Control of MLPA Taskforce Meeting](#)
- [Go Fish? Not in No-Fishing Zones on California's Pacific](#)
- [Overview: What is the Marine Life Protection Act \(MLPA\)?](#)

Source Title & Format	Three Lateral Searches	Author Perspective	Key Ideas
What was the title of the source? What format was it: article, video, or something else?	What three lateral searches did you conduct?	Is there any information about the author or creator that you should keep in mind while interpreting the source?	What did you learn from the source?
Empty space for student input	Empty space for student input	Empty space for student input	Empty space for student input

Session 2: Asking Questions About MPAs

Investigating Your Research Team's Questions

Assigned Question:	
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Source Title & Format	Three Lateral Searches	Author Perspective	Key Ideas
What was the title of the source? What format was it: article, video, or something else?	What three lateral searches did you conduct?	Is there any information about the author that you should keep in mind while interpreting the source?	What did you learn from the source?

Session 2: Asking Questions About MPAs

Taking Time to Reflect

In your field notebook, take a few minutes to reflect on your experiences during Session 2.

1. What did you do during Session 2?
2. What did you learn? How did your thinking change?
3. Do you think it's important to use lateral reading strategies when looking for information? How can they help you to assess a source?
4. What questions do you still wonder about?

Session 3: Building a Model

Brainstorming Components and Processes

What biotic components, abiotic components, and processes might affect the fish population in the Crystal Cove State Marine Conservation Area?

With your research team, brainstorm what might affect the fish population in the Crystal Cove SMCA. In the table below, sort them into three categories:

- **Biotic components:** Parts of the ecosystem that are alive, such as fish or plankton.
- **Abiotic components:** Parts of the ecosystem that are not alive, such as temperature or sunlight.
- **Processes:** Things that happen, such as climate change or photosynthesis.

Biotic Components	Abiotic Components	Processes

When your research team is finished brainstorming, choose the 10-12 components or processes that you predict will have the **biggest** effect on the fish population. Star or highlight each one.

Session 3: Building a Model

Drafting Your Model

Modeling Question: What affects the fish population in the Crystal Cove State Marine Conservation Area?

Session 3: Building a Model

Using Your Model to Make Predictions

Pick four or five factors in your research team's model that are at least two steps removed from the fish population.

Using the relationships within your model, make a prediction on how increases or decreases to these factors will impact the fish populations within the Crystal Cove State Marine Conservation Area.

Session 3: Building a Model
Using Your Model to Ask Questions

What questions does your research team still have about your model?

Session 3: Building a Model

Taking Time to Reflect

In your field notebook, take a few minutes to reflect on your experiences during Session 3.

1. What did you do during Session 3?
2. What did you learn? How did your thinking change?
3. Why do you think scientists use models? How can models help you to make a prediction about interactions within an ecosystem?
4. What questions do you still wonder about?

Session 4: Diving Deeper

Brainstorming Our Questions

With your research team, look back at the questions that you still have about your model. Come up with a plan to find the answer to each questions.

Our Questions	How We Plan to Answer Each Question

Session 4: Diving Deeper
Answering Our Questions

Session 4: Diving Deeper
Answering Our Questions

Our Questions	What We Did	What We Learned	Clues for Our Model

Session 4: Diving Deeper

Taking Time to Reflect

In your field notebook, take a few minutes to reflect on your experiences during Session 4.

1. What did you do during Session 4?
2. What did you learn? How did your thinking change?
3. What changes did your research team make to your model? Why?
4. What questions do you still wonder about?

Session 5: Preparing to Collect Data

Thinking About a Monitoring Plan

With your research team, take a few minutes to review your model. Discuss a few components within your model that you may be able to monitor over time and then brainstorm how you might monitor them.

Components Within our Model	How We Might Monitor Them

Session 5: Preparing to Collect Data

Training For Your Monitoring Project

Your Assigned Monitoring Project:

Training Modules:

- [Digital Fishing Monitoring Training](#) and [Crystal Cove Fish Field Guide](#)
- [Plankton Monitoring Training](#) and [Crystal Cove Plankton Field Guide](#)
- [Water Quality Monitoring Training](#) and [Crystal Cove Water Quality Equipment Guide](#)

Use the space below to take notes as you complete the training program.

Session 5: Preparing to Collect Data

Taking Time to Reflect

In your field notebook, take a few minutes to reflect on your experiences during Session 5.

1. What did you do during Session 5?
2. What did you learn? How did your thinking change?
3. Do you feel prepared to help record and process data for your monitoring project? What questions do you still have? What else do you need to know?
4. What questions do you still wonder about?



Session 6: Collecting Data

Virtual Field Expedition

Use the space below to record data and take notes during your virtual field expedition to the Crystal Cove SMCA.

Session 6: Collecting Data

Taking Time to Reflect

In your field notebook, take a few minutes to reflect on your experiences during Session 6.

1. What did you do during Session 6?
2. What did you learn? How did your thinking change?
3. Why do scientists need evidence (such as collecting data)? What role do you think evidence plays in answering scientific questions?
4. We want to determine how the Crystal Cove SMCA is changing over time. Now that you've collected data, what will your next step be?

Session 7: Analyzing Our Data

Interpreting Your Graph

Use your graph to respond to the following questions. Be prepared to share any trends that you notice with your research team!

1. Is the slope of your trendline positive or negative? Is this an upward trend or a downward trend?
2. What is the slope of the trendline? Is this a large or small change over time?
3. What is the R^2 value for your trendline? Is there a lot of variation in your data or does it closely follow the trendline?

If you can, paste a screenshot of your graph below.

Session 7: Analyzing Our Data

Thinking About Trends

With your research team, discuss any trends that you noticed in your data. Did each factor increase, decrease, or stay the same over time?

Factor	Change Over Time

Session 7: Analyzing Our Data

Validating Your Model

Look back at your research team’s model from Session 3. Choose at least three relationships between two factors that were present in your model and were also present in the data that you analyzed.

Two Factors in Your Data and Your Model	What relationship did you predict in your model?	Did the data support your assumption, disprove your assumption, or was it inconclusive?
Example: Fish population and air temperature.	Example: We predicted that as the air temperature increased, the fish population would decrease.	Example: The data <i>disproved</i> our assumption because...

Are there any changes that you want to make to your model as a result of your data?

Session 7: Analyzing Our Data

Explaining What You Found

Based on your findings, do you think that the Crystal Cove State Marine Conservation Area's ecosystem is changing over time?

Claim	Based on our findings, we believe that the Crystal Cove State Marine Conservation Area's ecosystem [is/is not] changing over time. Specifically...
Evidence	The evidence from our data that supports this claim is...
Reasoning	We think these trends are occurring because...

Session 7: Analyzing Our Data

Making a Recommendation

In 2022, the MPA regulations for California's South Coast region are due to come up for review. At that time, Crystal Cove State Park will be able to share input on whether they think the regulations should stay the same or change.

Based on what your research team has learned about the Crystal Cove SMCA, what recommendation would you make to Crystal Cove State Park?

Be sure to include...

- Are the MPA regulations working as intended or should they be altered?
- What evidence supports your claim?
- What is your reasoning?
- How do you predict that your recommendation will affect the ecosystem in the Crystal Cove SMCA?

When the South Coast MPAs come under review in 2022, our recommendation is that Crystal Cove State Park should...

Share your explanation and recommendation with us on [Google Forms](#) or [Flipgrid!](#)

Session 7: Analyzing Our Data

Taking Time to Reflect

In your field notebook, take a few minutes to reflect on your experiences during Session 7.

1. What did you do during Session 7?
2. What did you learn? How did your thinking change?
3. Do you think it is important to understand how the ecosystem in a place like the Crystal Cove SMCA is changing? Why or why not?
4. Beyond making a recommendation, what else could we do to protect the Crystal Cove SMCA?

Session 8: Choosing a Message

Planning Your Social Media Piece

With your research team, take a few minutes to review the rubric for your final project: [\[link goes here\]](#)

Then, together, begin planning your social media piece!

Choose a Problem: What problem does your research team want to focus on for your final piece?

You might think about:

- How is the problem impacting the Crystal Cove SMCA?
- What needs to change in order to solve the problem?
- Who would you need to reach to help solve the problem?
- Is there evidence in your field notebook or elsewhere that could help illustrate it?

Choose an Audience: Who do you want to reach?

You might think about...

- How can your audience help solve your problem?
- What is your audience likely to already know about the problem? What do they need to learn?

Frame the Science Idea: What is the key science idea that your audience will need to understand?

You might think about...

- How can you frame your science idea so that it is easy to understand? What everyday language can you use to explain it?
- How can you make the science idea relatable to your audience? How can you help them forge a personal or emotional connection?

Draft Your Call to Action: What do you want your audience to know or do as a result of viewing your social media piece?

You might think about...

- Actions that they can do offline, like following the rules at the beach, participating in a beach clean-up, or something else.
- Actions that they can do online, like sharing a story of their own, liking/subscribing, or something else.

Session 8: Choosing a Message

Taking Time to Reflect

In your field notebook, take a few minutes to reflect on your experiences in Session 8.

1. What did you do during Session 8?
2. What did you learn? How did your thinking change?
3. Why is science communication an important part of science practice?
4. What are your next steps to complete your social media piece? What questions do you and your teammates have?

Session 9: Developing Your Plan

Taking Time to Reflect

In your field notebook, take a few minutes to reflect on your experiences during Session 9.

1. What did you do during Session 9?
2. What did you learn? How did your thinking change?
3. How do social media professionals use data? Is this similar or different from how we use data in science?
4. What are your next steps to create your social media piece? What questions do you and your teammates still have?

Session 10: Executing Your Plan

Taking Time to Reflect

In your field notebook, take a few minutes to think back to your experiences throughout the entire MPA Exploration program.

1. What did you learn? What was your favorite part? What did you struggle with?
2. What challenges do you think scientists face in protecting places like Crystal Cove?
3. As a scientist, why is it important to be able to communicate more broadly with our community?
4. How can we do a better job of making sure that everyone in our community is included in that process?