

Responsive Mini-Lessons: Co-constructing—Somewhat Descriptive

About Responsive Mini-Lessons

Responsive Mini-Lessons (RMLs) provide short, targeted lessons that are responsive to each class's facility with oral argumentation, as assessed with the DiALoG Tool. The DiALoG Tool has eight components. Four are intrapersonal—claims, evidence, reasoning, and relevance; four are interpersonal—listening, co-constructing, critiquing, and regulation. RMLs are aimed at providing more practice with one of the eight components of the DiALoG Tool, so your students are more able to work together to enact rich, thoughtful, and engaging oral argumentation. For each component, the following phrases can be assigned, via the DiALoG Tool, to describe your students' abilities: Not Descriptive, Somewhat Descriptive, or Very Descriptive. An assigned phrase of Not Descriptive or Somewhat Descriptive indicates that your students likely need more support with that particular component of oral argumentation; a lesson is then suggested to help your students strengthen their abilities in that area. If the Not Descriptive phrase is assigned, the lesson provides basic, introductory support; if the Somewhat Descriptive phrase is assigned, the lesson assumes some basic facility with that component and provides an opportunity to practice it with more focus.

For the Co-constructing RMLs, the Not Descriptive lesson asks students to work with sentence frames to practice co-constructing ideas by using everyday examples as well as science examples. The Somewhat Descriptive lesson builds on the concepts introduced in the Not Descriptive lesson as students practice revising critiques to make them helpful for moving the conversation forward.

Does a Responsive Mini-Lesson for the Somewhat Descriptive Level Make Sense for Your Class?

The suggestion to provide a Responsive Mini-Lesson for the Somewhat Descriptive level indicates that, based on your use of the DiALoG Tool, the following statement best describes your students' use of co-constructing ideas during oral argumentation: *Students sometimes build on ideas offered by other students*. For more detail about this level and how it compares to other levels, please see the DiALoG Tool User Guide.

There is one Responsive Mini-Lesson provided for the Somewhat Descriptive level.

Goal

- Help students understand how to work together to co-construct complex ideas by sharing thinking and evidence.

Responsive Mini-Lesson

Materials and Teaching Considerations

For the class

- Projection: Question and Claims About Mosquitofish
- Projection: Mosquitofish (*Gambusia*)
- Projection: An Adult Mosquito
- Projection: Mosquito Larvae in Water, Magnified
- Copymaster: Mosquitofish Statement Cards
- scissors or paper cutter*
- paper clips*

For each group of four students

- 1 set of Mosquitofish Statement Cards, clipped together (12 cards/set)

*teacher provided

Time frame: 30 minutes

Teaching Considerations

Most lessons will begin with an introduction followed by the lesson itself. The introduction is a brief activity that sets up and supports the lesson that follows. Each introduction is teacher-led, while the lesson that follows is more student-centered.

Getting Ready

1. Decide how to present the resources.

During the lesson, you will present Question and Claims About Mosquitofish; Mosquitofish (*Gambusia*); An Adult Mosquito; Mosquito Larvae in Water, Magnified. The lesson is written as if these resources will be projected.

2. Prepare Mosquitofish Statement Cards.

There are 12 cards/set on 2 sheets. Make one copy of the entire set for each group of four students. Cut apart each strip and clip together each set.

3. Write the following co-constructing sentence frames on the board:

Sentence Frames: Co-Constructing

- I know that _____.
- Something related to your idea is _____.
- One way these two ideas are related is _____.
- Another way these two ideas are related is _____.

Introduction

1. Review (or introduce) the concept of

co-construction. (If you did not teach the Not Descriptive level, introduce the concept of co-construction to students.) Explain that in this lesson, students will work on an important attribute of oral argumentation: co-construction. Ask students for ideas about what this could mean and why it might be important when participating in oral argumentation.

2. Summarize students' thinking.

After several students have shared ideas about what the term *co-construction* means, summarize their thinking. Add the following ideas, if students did not mention them:

- When you are working with other students to better understand something, you can use, or incorporate, the ideas they offer. This will create an even more complex and comprehensive idea than if only one person thought of it.

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- In addition, when you share ideas, you are helping other people think about something in a new way. Even if you think someone else's ideas are not correct, you have to put some thought into figuring out why those ideas aren't correct and explaining those ideas to someone else. This helps your own thinking become clearer, stronger, and more focused.

3. **Explain next steps.** Let students know that they will now participate in an activity designed to help them be aware of and participate in the act of co-constructing while discussing evidence.

Lesson

1. **Project Question and Claims About Mosquitofish and introduce the context of the activity.** Read aloud the question and claims. Say, **“In this activity, you will get evidence that will help you evaluate and think about this question and the two claims.”**
2. **Project Mosquitofish (*Gambusia*).** Say, **“You will read a lot more about this organism in a few minutes.”**
3. **Project An Adult Mosquito.** Say, **“You are probably familiar with this organism. You will also read more about mosquitoes today.”**
4. **Project Mosquito Larvae in Water, Magnified.** Say, **“You may not be familiar with what mosquitoes look like during the early part of their life cycle. When mosquitoes are young, they live in the water and look like this. The mosquito larvae in this photo are enlarged—most mosquito larvae are about 1 centimeter long. You'll also read more about mosquito larvae today.”**
5. **Hold up a set of Mosquitofish Statement Cards and explain next steps.** Let students know that there are 12 cards, and they will work in groups of 4.
 - **Each student will take three statement cards.** Although each card has a number on it, the statements are in no particular order.
 - **Annotate statements.** Each student will read and annotate all three statements. Students can annotate with questions, ideas, etc.
 - **Groups discuss mosquitofish.** Group members will share information.
6. **Assemble groups and distribute Mosquitofish Statement Cards.** Distribute one set of cards to each group of four. Provide a few minutes for all students to read and annotate their statement cards. Let students know that they will not discuss information yet.
7. **Provide rationale for group discussions.** Explain that each group will now hold a discussion about mosquitofish. Say, **“The purpose of your group discussion is to share the information each of you has so you can gather as much information as possible about mosquitofish, how they might affect an ecosystem, and whether or not there are other ways of stopping mosquitoes from biting too many people. To do this, you will need to focus on the oral argumentation practice of co-constructing. Each group member has different information. Together, when you share and listen to one another, you will have a more complete picture of mosquitofish than you would have on your own.”**

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8. Provide directions for group discussions.

Let students know that they will discuss the information on their statement cards by using the sentence frames on the board. Explain that students do not have to read the statements from their cards verbatim; they can summarize ideas from their cards.

- One student will start by sharing information from one of the statement cards by using the first sentence frame on the board: *I know that _____.*
- Another student will then share an idea from one of the statement cards that seems to relate to the first idea by using one of the other sentence frames, such as: *Something related to your idea is _____.*
- Students will continue to hold a conversation in this way, using the sentence frames to help them connect their ideas.

9. **Groups discuss.** Circulate and remind students to use the connective language provided by the sentence frames as needed.

10. **Project Question and Claims About Mosquitofish again.** After students have had time to share all information from their statement cards, ask them to consider the question and claims that set up the discussion at the beginning of the lesson. Say, **“You have now thoroughly discussed a lot of different evidence and information about mosquitofish and their**

possible role in an ecosystem. Take a few minutes to discuss which claim you think is better supported and why, based on the information you have and the information you heard from others in your group.”

11. **Whole-class discussion of claims.** Have groups share which claim they think is best supported, based on the cumulative evidence.

12. **Debrief co-constructing.** Have students share what it felt like to purposefully listen and connect ideas in their groups in order to have a more complete picture of the mosquitofish problem. Discuss how the sentence frames played a role in promoting this kind of thinking and discussion. Say, **“One way to train yourself to connect ideas between people who are speaking is to purposefully look for ways to connect your thinking to someone else’s thinking as they are speaking. Sentence frames, like the ones you used today, helped you to do this, and we can use them in the future as well. Co-constructing is an active way to engage with others during oral argumentation in order to promote deeper thinking and ensure that you are learning from your peers when you discuss.”**

Why This Mini-Lesson Matters

This mini-lesson provides accessible examples and language supports to help students understand and engage in the co-construction of science ideas with peers. Designing an activity structure that prompts and supports specific interactions such as co-constructing can help students increase those interactions (Berland 2011). Using everyday examples and/or highly accessible science examples ensures that challenges with science content do not prevent students from grasping and engaging in the process of co-constructing. Research has also shown that students struggle with learning the language to communicate science ideas, which creates a major obstacle to learning science (Wellington and Osborne 2001). The sentence frames used in this lesson help students learn and produce language to express and co-construct science ideas.

Resources

Berland, L. K. (2011). Explaining variation in how classroom communities adapt the practice of scientific argumentation. *Journal of the Learning Sciences* 20(4): 625-664.

Wellington, J., and Osborne, J. (2001). *Language and Literacy in Science Education*. United Kingdom: McGraw-Hill Education.



The Learning
Design Group



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Question and Claims about Mosquitofish

Question: Should we use mosquitofish to get rid of mosquitoes?

Claim 1: Yes, we should use mosquitofish to get rid of mosquitoes.

Claim 2: No, we should not use mosquitofish to get rid of mosquitoes.

Mosquitofish (*Gambusia*)



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An Adult Mosquito



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Mosquito Larvae in Water, Magnified



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Mosquitofish Statement Cards

1

Mosquitofish are small, gray fish. Their bodies are mostly see-through. Female mosquitofish are much bigger than males.

Mosquitofish Statement Cards

2

Mosquitofish live mostly in ponds, creeks, and other freshwater habitats and can be found all over the world.

Mosquitofish Statement Cards

3

Mosquitofish got their name because they are known to eat mosquito larvae, or young mosquitoes that live in the water. Mosquitoes live in the water for about two weeks before they become adult mosquitoes that can fly.

Mosquitofish Statement Cards

4

Female mosquitoes take blood from humans and other animals. When they do this, they can spread disease from one animal they take blood from to the next. Some diseases they spread are very harmful to humans.

Mosquitofish Statement Cards

5

Mosquitoes live their lives in different stages. In one stage, they are larvae, or small swimming organisms. They stay in the water for approximately two weeks before they change and are able to fly.

Mosquitofish Statement Cards

6

Some governments give away mosquitofish for free and ask people with ponds or creeks near their homes to put the mosquitofish in them. Mosquitofish eat mosquito larvae. They can kill many of the mosquitoes before the mosquitoes reach adulthood.

Mosquitofish Statement Cards

7

Poisons have been used to kill mosquitoes, but these are bad for the environment and bad for humans.

Mosquitofish Statement Cards

8

Mosquitofish are very aggressive predators that eat many different kinds of organisms. Some scientists believe that when mosquitofish are added to ponds, they ruin the environment that was already there.

Mosquitofish Statement Cards

9

The most common suggestion for keeping mosquito populations down is to drain the water that mosquitoes live in when they are young. This solution isn't always practical, since many young mosquitoes live in ponds or creeks that people want to keep around, and no one wants to drain!

Mosquitofish Statement Cards

10

There is evidence that adding mosquitofish to a pond or creek might make the mosquito problem in an area even worse, because mosquitofish end up killing other predators that would normally eat young mosquitoes.

Mosquitofish Statement Cards

11

When scientists study ecosystems (groups of animals and plants that live in the same area), they often look carefully at the predators that live in that ecosystem. If one kind of predator is eliminated, it is often very bad for the ecosystem because all the animals that the predator used to eat now have a much better chance to survive. When too many of one kind of organism start to live in an area, the ecosystem can become unhealthy.

Mosquitofish Statement Cards

12

Female mosquitofish have been known to eat hundreds of mosquito larvae in one day.