

Teacher/Video	SSUP_Belcastro_gr5_Matter_L5_C1
Content Area	Matter
STeLLA Strategy	Strategy 5: Engage students in analyzing and interpreting data and observations Strategy 7: Engage students in constructing explanations and arguments
Context	This is lesson 5 of 7 in the Matter unit. In this lesson, students have tested the unhealthy pond water for the properties previously studied about the pollutants and have summarized the results of that investigation. During this clip, they are working together to use those results to answer the Focus Question: How can we identify the pollutants in the pond water?

- 00:00:03 S1: There also could be not just one pollutant in the water.
- 00:00:08 T: Mmm.
- 00:00:08 S1: If there's something, that could also be salt because even though the salt doesn't look like it does things but it could help another thing do what it did to the water.
- 00:00:17 T: So let me put that question-- unintelligible 00:00:19 asked it this question. I'm going to ask it as a question. To everybody else, could more than one of these claims be correct?
- 00:00:24 SS: Yes.
- 00:00:25 T: Yes. We need to remember that as we move forward, right? We're not just picking one of these. More than one could be correct. That's really important scientific thinking. Good. What was our last conductivity?
- 00:00:38 T: Tell me about conductivity and which of these claims that supports? Excellent. I've got one, two, three scientists. Their heads are in it. If you're not sure, you could look back at your table. You can look up here, but that unhealthy pond water conducted electricity, right? So what does that mean for what might be in the water? What do you think? Right here.
- 00:00:59 SN: Um, uh.
- 00:01:01 T: I know. Sorry. You're lined up. How about right here, Richard?
- 00:01:04 SN: Um, for me, at least all the pond water's- um, pond water that we tested, um, had electric conductivity so, um, there's only two that, um, uh, that has electric conductivity.
- 00:01:23 T: Which two pollutants had electrical conductivity?
- 00:01:26 SN: Fertilizer and salt.
- 00:01:28 T: So, the conductivity would be-- Would support this one, right?

00:01:31 SN: Mm-hmm.

00:01:33 T: Um, conducts-- Just the E for short. And salt conducts electricity. Okay. The detergent water, did that conduct electricity?

00:01:51 SN: No. No.

00:01:53 T: Not really. Not really well, right? We have a check here but I feel like that buzzer, like maybe a buzz, but was really quiet.

00:02:00 SN: Yes.

00:02:01 S: I don't even think it--

00:02:02 T: It didn't even buzz. Okay. Okay. Great. Thank you for that reminder. Now, what else? I have-- These are a lot of properties, but folks, there were properties that we observed without running tests just visually, just looking at it, right? What do you notice? What would we see here if there is fertilizer in the water?

00:02:22 SS: The crystals?

00:02:23 T: Right here.

00:02:24 SN: There might be more-- I mean like a- more of like purple--

00:02:28 T: That fertilizer had a strong color to it, right? When you look at this, that's a test that scientists do. Remember, Sarah said that in the video. When we just observed it, we can see. Is there fertilizer in this water?

00:02:40 SS: No.

00:02:41 T: No. Because-- Is this bright blue?

00:02:44 SS: No.

00:02:44 T: No. So, which one of these claims would that support?

00:02:48 S: The first one.

00:02:49 SN: The second one.

00:02:51 T: That there's not-- The color tells us we-we could very clearly see fertilizer in that water. We can see that there is not blue in this water, right? What else? What could we see with soapy water? What were some of those other properties that were really obvious? When you mixed up detergent and water, what properties were very obvious? Yeah, Gideon?

00:03:16 S: It made it like a lot more murky.

00:03:18 T: It made it really murky. And so you have the murkiness. They're good.

00:03:21 S: When I looked through the turbidity disk, I saw like a- it-- I did see it, but like, it made it a lot more murky than it was.

00:03:28 T: That Secchi disk. Okay. It was really murky. Good. What else did we observe with the soap? Yeah?

00:03:34 SN: Bubbles.

00:03:35 T: Bubbles. Does our polluted water have bubbles?

00:03:37 SS: Yes.

00:03:39 T: Which one, if I shake it, does it have more?

00:03:41 S: Yeah.

00:03:43 T: So, which one does that support? There is detergent or there's not?

00:03:46 SS: There is.

00:03:51 T: What else do you think?

00:03:52 SN: Uh, so there's one thing about maybe there isn't detergent. It's because, uh, detergents stay murky all the time really.

00:04:04 T: So maybe there wasn't enough murkiness? Okay. So, are other folks wondering that as well?

00:04:10 S: Yeah.

00:04:10 T: Since our pond water was just a little murky. Um, not murky enough. Right. All right. What else can we see? We know we had bubbles. We know-- Let's just start with fertilizer. It was murky. Do we have another way to explain the murkiness besides fertilizer?

00:04:38 SN: It was--

00:04:38 T: Yeah. Right? We know that it conducts electricity but the pH and the color were against it. If we looked our evidence for fertilizer, do we think that there's fertilizer in the water? Thumbs up if yes. Thumbs down if no. We have evidence in both that support both claims, right? I see a lot of thumbs down. This is the hard work of science. There's not a clear answer, right? Why are folks giving a thumbs down for this? More folks are giving thumbs down than thumbs up. Why? Can you tell me why? Yes? Yep. If you want to tell us why? Why are you giving a thumbs down?

00:05:21 S: Because water isn't blue.

00:05:24 Teacher: Say that a little bit louder.

00:05:27 S: The water isn't blue.

00:05:29 Teacher: The water isn't blue, right? So we would real-- We would expect to see that very clearly. The water isn't blue. Does that seem like pretty strong evidence?

00:05:39 SN: Yes.

00:05:39 T: That evidence might be stronger than some of the others, especially if there's ways we can explain it. What do you think, Elaine?

00:05:45 S: Um, another one is that the pH of the pond water was six, and the pH of the fertilizer mixed with water was three to four.

00:05:54 T: Yeah. So does it feel like-- Now, here's the question. Can we explain the murkiness with a different pollutant?

00:06:02 SS: Yeah.

00:06:02 T: Yeah. Which pollutant can we use to explain the murkiness? Everybody?

00:06:06 SS: Detergent.

00:06:07 T: Detergent. Can we explain conducts electricity with a different pollutant?

00:06:10 SS: Yes.

00:06:10 SS: Yeah.

00:06:11 T: Which pollutant?

00:06:12 SS: Salt.

00:06:13 T: So we can explain both of those another way. Can we explain the color and not seeing blue another way?

00:06:18 SS: No.

00:06:19 T: No. So which of these claims is true? Is fertilizer or there's not fertilizer? Everybody.

00:06:23 SS: There's not.

00:06:24 T: There's not fertilizer. We can say our evidence more strongly supports that one, right? Now these two. There is detergent or there's not detergent? Let's look at the evidence that we have. Does our evidence more strongly support one or the other?

00:06:39 SS: Yeah.

00:06:40 T: Yeah. Our evidence more strongly supports one or the other. Which one does our evidence more strongly support?

00:06:47 T: Thumbs up or thumbs down? Thumbs up. Our evidence more strongly suggests, we have three pieces of evidence for yes and we have one kind of for no, right? Our evidence more strongly supports this claim. And what about this one, salt or no salt?

Which one does our evidence more strongly support? Yes or no?

00:07:08 SN: Yes.

00:07:10 T: I see lots of thumbs up. So when we look at this, does our evidence support that there's more than one pollutant in that unhealthy water?

00:07:17 SS: Yes.

00:07:18 S: Yep.

00:07:18 T: Yeah. Can anyone-- Here's what I want you to do, you're gonna turn and talk at your table group and I want you to come up with a summarizing statement. So you are going to come up with one sentence that summarizes based on our investigations about properties which pollutants are in the pond water and which pollutants are not.

Lesson Analysis Protocol: SSUP_Belcastro_gr5_Matter_L5_C1

1. Identify Lens and Strategy

- What instances of engaging students in analyzing and interpreting data and observations do you observe in the clip?
- What instances of engaging students in constructing explanations and arguments do you observe in this clip?

2. Analyze the Video

- What do students understand (or not) about properties of matter being used to identify substances?
- How did the teacher's use of the identified STeLLA strategies reveal, support, or challenge student thinking (or not)?

Lesson Analysis Step	To Do	Your Analysis
Claim	Turn an observation, question or judgment into a specific claim that responds to the focus question.	
Evidence	Point to a specific place in the video transcript, lesson plan, or student work that supports your claim. Be sure to use timestamps if your evidence comes from a transcript.	
Reasoning	Connect your claim and evidence with reasoning based on STeLLA Strategies, research on teaching and learning, your teaching experience, or scientific principles.	
Consider Alternatives	Alternatives may include an alternative interpretation of evidence, new questions this clip, or analysis might raise, and/or alternative question(s), activity(s) or strategies that might have better supported student learning.	

3. Reflect and Apply

What did you learn through this analysis that you want to apply to your own practice?

Distillation Apparatus

