Matter
Lesson 2: Observing Properties

Grade: 5	**Length of lesson:** 79 minutes	**Placement of lesson:** 2 of 7
Anchoring Phenomenon: A healthy pond near a school has changed, and students see that there are a few dead fish in the pond.		
Unit Learning Goal: We can use our understanding of the particulate nature of matter and properties of matter to explain the world around us.		
Lesson Main Learning Goal: Matter has many different properties that can be observed. **Science and Engineering Practices** • Planning and Carrying Out Investigations: Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials is considered. • Using Mathematics and Computational Thinking: Measure and graph quantities such as weight to address science and engineering questions and problems • Developing and Using Models: Develop a model to describe phenomena. **Crosscutting Concept:** Scale, Proportion, and Quantity: Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.		
Unit Central Question: How can we figure out what was mixed with pond water that could have changed the water?		**Lesson Focus Questions:** What might be in the water that could have killed the animals? What can we observe about each of those dangerous materials?
Science content storyline: Certain properties of matter can be directly observed. Mixing materials with water allows additional properties to be measured. Properties are any traits of a material that can be measured. Directly observable properties include state of matter, grain size, and color, among others.		
Ideal student response to the Lesson Focus Questions: There are several tests we can run to tell whether there are dangerous materials—detergent, dirt, fertilizer, salt, or oil—in the water. We can start by observing the water when it's mixed with each of the pollutants.		

Preparation

<table>
<tr><th>MATERIALS NEEDED</th><th>AHEAD OF TIME</th></tr>
<tr><td>

Teacher Resources:

- Lesson 2 video from Tennessee Aquarium

Student Handouts

- Lesson 2_HO 1 *Data Table* (1 per student)

Other Materials

- Supplies for the materials station
  - plastic containers with lids for holding pollutants (2 per pollutant: motor oil, salt, hand soap, dirt, and fertilizer)
  - 10-mL measuring spoons (1 per plastic container of dry pollutants)
  - 9-oz. clear cups (2 per small group, 1 per activity, wash and reuse)
  - craft sticks for stirring (1 per mixture, wash and reuse)
  - 5-mL syringes (1 per container of wet pollutants)
  - 6 50-mL syringes for measuring water
  - medium-sized containers for groups to get water from the materials station
  - small bottles with lids that could be used to shake mixtures
  - hand lenses (1 per group)
  - #2 paper coffee filters (1 per group if they choose to use it in their observations)
  - coffee filter holders (3 per class, groups can take turns using if they choose to collect data about filtering pollutants)
  - 1 kitchen scale sensitive to the gram
- trays (1 per group)
- 1.5 L water bottles to transport water
- materials for clean up: bucket to dump mixtures, soap to wash cups
- petri dishes without lids for evaporating mixtures (1 per mixture, see “Ahead of Time”)
- sticky notes and fine-point markers (as needed for DQB questions)
- chart paper and markers

</td><td>

- Review the “Introduction” and “Properties of Matter” in the *Content Background* document.
- Prepare the handout.
- Check the video link to make sure it’s working.
- Create a chart as shown on p. 17 of this lesson plan to capture group observations about the properties of the 5 pollutants.
- Before the lesson, check with your school custodian about procedures for disposing of mixtures. Different procedures might be necessary for some pollutants (for example, water and salt, hand soap, and oil may be able to be poured down the sink where water and dirt should be dumped outside or all mixtures may need to be poured down a specific drain the custodian can access).
- For Lesson 6, About a week ahead use the mixtures created in this lesson to prepare petri dishes with several pollutant-water mixtures and let the water evaporate. If you prepare these now, they should be ready by the time you get to Lesson 6! Leave samples of salt & water, detergent & water, both salt & detergent with water, fertilizer & water, and both unhealthy and healthy pond water each in a petri dish and let the water evaporate. Create a sticky note label to place beneath each petri dish so you remember which is which. Try to not move the dishes during the evaporation process or touch the crystals after evaporation so students can observe what is left behind after the water evaporates.

</td></tr>
</table>

Lesson 2 General Outline

Time	Phase of lesson	How the science content storyline develops
2 min	**Link to Previous Lesson:** Reference the Driving Question Board and questions that involve the idea of dangerous substances in the water.	
1 min	**Focus Questions:** Introduce today's focus questions: **What might be in the water that could have killed the animals? What can we observe about each of those dangerous materials?**	
15 min	**Setup for Activity 1:** Watch a video from the Tennessee Aquarium defining pollutants and explaining the most common pollutants that are found in water in communities. Set up data table.	Certain properties of matter can be directly observed. Mixing materials with water allows additional properties to be measured.
10 min	**Activity 1:** Work in groups to record observations about salt and salt mixed with water.	Directly observable properties include state of matter, grain size, and color, among others.
10 min	**Follow-up to Activity 1:** Compare results. Highlight differences in data collection procedures (quantity of salt, quantity of water, amount of mixing, etc.). Reach class consensus of methods for controlling variables and conducting trials.	Properties are any traits of a material that can be measured.
10 min	**Setup for Activity 2:** Design a plan to investigate the five pollutants.	
10 min	**Activity 2:** Observe one pollutant and record observations. Do a gallery walk to look at each pollutant in and out of water.	
15 min	**Follow-up to Activity 2:** Create a class consensus chart with observations.	
5 min	**Summarize and Synthesize:** Create a model for what would look like if they were to zoom in on their expert group pollutant mixture.	
1 min	**Link to Next Lesson:** Links science ideas to the next lesson.	

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
2 min	**Link to Previous Lesson** <u>Synopsis</u>: The teacher references the Driving Question Board and student questions that involve the idea of dangerous substances in the water.	Engage students in communicating in scientific ways. (Slide 2) Link to previous lesson. (Slide 3)	Before we start today, let's revisit our Communicating in Scientific Ways chart. **Which of these stems did we use in our first lesson?** **What do you see on CSW that may help us as we work together to investigate the pond water?** ***NOTE TO TEACHER:*** *Adjust the next section to reflect student ideas. If the class didn't generate any questions around pollutants, introduce the day's focus questions yourself as the first matter the class will need to investigate to help us figure out what's happening with the pond water.*	Last time, we asked "why" and "how" questions. **Can you give an example?** We searched for new ideas from other sources when we watched the video about water testing. Design an investigation—when we thought about ways we could test the water. We could actually do some of our investigations. We could observe what happens to the water. I think we could use all of them! **How can we investigate the water?**

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
1 min	**Focus Questions** <u>Synopsis</u>: Introduce today's focus questions: **What might be in the water that could have killed the animals? What can we observe about each of those dangerous materials?**	Set the purpose for the lesson with a focus question. (Slide 4)	Let's take a look at some of the ideas you all clustered together on our Driving Question Board during our last lesson. This cluster you put together because it relates to whether there is anything dangerous in the water. During this lesson and our next lesson, we'll work together to figure out these focus questions: **What might be in the water that could have killed the animals? What can we observe about each of those dangerous materials?** Last time, we learned that scientists often start to investigate water through observation.	
15 min	**Setup for Activity 1** <u>Synopsis</u>: Watch a video from the Tennessee Aquarium defining pollutants and explaining the most common pollutants that are found in water in communities. Set up data table together—As we mix each of these pollutants into water, what should we be recording? <u>Main science ideas</u>: Certain properties of matter can be directly	Make explicit links between science ideas and activities (before activity). (Slide 5)	Before we investigate the pond water specifically, we have another video created by the Tennessee Aquarium to learn more about what dangerous substances may be in the water. As you watch this video, pay attention to what dangerous materials are most commonly found in ponds or streams. ***NOTE TO TEACHER:*** *Play the video. Depending on how thoroughly students were able to hear key ideas, consider whether it would help to play it a second time.* Now that we've watched the video, let's review some of the important ideas we've just learned. **What does the term *pollutant* mean?**	

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
	observed. Mixing materials with water allows additional properties to be measured.		**What do *point source pollution* and *nonpoint source pollution* mean?** The pond that we are worried about is in a community. **What are five common pollutants that can be found in water like the pond in this community?** **What could we do to learn more about each of those pollutants themselves?** ***NOTE TO TEACHER:*** *Use questioning strategies to allow students to suggest ideas for what you will test. Ultimately, you will mix each of these separately in water and make careful observations.*	Something dangerous to living creatures in the air, in water, or on land. *Point source* means you can point to where it's coming from. *Nonpoint source pollution* means it may be coming from anywhere in a bigger area. Salt. Dirt or soil. Fertilizer. Detergent or soap. Oil. We could test the common pollutants we learned about in the video. **What kind of tests do you think we could do?** Well, they are in a pond, so maybe we should mix them with water and see what they do. **OK, that's a good suggestion! Any other ideas?** We should mix them one at a time.

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
		(Slide 6)	For our investigations during this lesson and the next, last time, we'll begin by observing each pollutant on its own and then mixing each of those pollutants separately into water in our classroom. During our next lesson, we'll figure out whether there are other tests we want to run on each one. **What might we want to look for and record as we observe each pollutant?** I'll capture our	**Why do you think that is important?** So we can look at each pollutant separately. **What else can we do to learn about the pollutants?** **Do you have any predictions?** Some might get cloudy, and some might stay clear. Some might form bubbles. Some of the pollutants might disappear into the water. **Have you seen this happen before?** **What else might we observe?** What color it is. **Do you mean what color the pollutant is before you mix it or after you mix it?** Both?

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
			brainstorm on the board to help us decide together what we'll record. ***NOTE TO TEACHER:*** *This list will inform the data table you and your class co-create before they start their investigation. Depending on how many ideas your students generate, you may need to prompt them with,* We have a lot of ideas. Can we combine any of these into a larger category? Let's agree on a couple different things to look for. *Two easy-to-manage categories are "pollutant only" and" pollutant mixed with water". When you're ready to set up the data table, distribute HO2.1* Data Table. *Use a document camera with a handout or a poster of the data table to model filling in each of the rows with a different pollutant and the columns with something like the headings above.* *Example:*	What it looks like before we mix it with water. What happens when we mix it up in water. **Why is knowing this important?** We might observe what happens or what does it look like after you filter it? We might want to draw a picture of each mixture.

<table>
<tr><th>Time</th><th>Phase of lesson and how the science content storyline develops</th><th>STeLLA strategy</th><th>Teacher talk and questions</th><th>Possible student and teacher dialogue</th></tr>
<tr><td></td><td></td><td></td><td><table><tr><th colspan="3">(Leave this blank initially.)</th></tr><tr><td colspan="3">(Leave this blank initially)</td></tr><tr><td></td><td>Pollutant only</td><td>Pollutant mixed with water</td></tr><tr><td>Salt</td><td></td><td></td></tr><tr><td>Detergent</td><td></td><td></td></tr><tr><td>Oil</td><td></td><td></td></tr><tr><td>Fertilizer</td><td></td><td></td></tr><tr><td>Dirt</td><td></td><td></td></tr></table>
We came up with several pieces of information we will capture. Why might it be helpful for each group to record information in a similar way?

Does anyone have ideas about how we can organize that information similarly among groups?

NOTE TO TEACHER: Later in the lesson, students will be working in five groups to investigate one pollutant each. For this activity, you can either put students in those five groups to avoid shuffling them later or let them work in smaller groups here so you have more variety in how they make the salt and water mixture.</td><td></td></tr>
<tr><td>10 min</td><td>Activity 1

<u>Synopsis</u>: Students work in groups to record</td><td>Engage students in communicating</td><td>For our first pollutant, we'll all start by observing salt.</td><td></td></tr>
</table>

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
	observations about salt and salt mixed with water. <u>Main science idea</u>: Directly observable properties include state of matter, grain size, and color, among others.	in scientific ways. Make explicit links between science ideas and activities (during activity). (Slide 7)	You'll send someone from your group up to get the materials you need. You don't need to use everything in the materials station. I just put a bunch of choices out here so that you all will have whatever you may want. If you need something different, just ask me. You have 5 minutes to conduct your investigation and to record your observations with your group. During this investigation, pay attention to our Communicating in Scientific Ways sentence stems. You may use more than these but pay particular attention to #2 observe and #3 organize data and observations. When you finish recording your observations, you can wipe off the table if anything spilled and put away everything except for your saltwater mixture. Please keep that until we're done sharing what each group found after our investigations. **Any questions about your job for right now?** ***NOTE TO TEACHER:*** *Leave the instructions vague at this point so it leads to a discussion in the follow-up around the importance of standardization in investigations. If any students ask you how much water or salt they should use, turn the question back to them and ask them what they think. You'll want the groups to keep their mixtures because some differences in their observations may be due to differences in the*	

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
			amounts of each material they used. You can use the follow-up discussion both to reach consensus around the properties of each pollutant and to highlight the need for consistency among groups. *For this activity, the only pollutant students will be using is salt. You may want to leave the other pollutants on a different nearby counter until students need access to those in the next activity. From the materials station, students may use the measuring spoon (10 mL), cups, craft sticks for stirring, syringes for measuring water, large cups for water, a bottle with a lid that could be used to mix, hand lenses, coffee filters, a funnel, and a kitchen scale sensitive to the gram. When it's time to clean up the saltwater mixtures and other pollutant mixtures later, be sure to follow building requirements for either dumping mixtures down the sinks or disposing of the differently in accordance with instructions from the building maintenance team.* *As the groups work, circulate and ask probing questions to understand the decisions and observations they're making. Note where groups are making different choices, like about the amount of the materials they're using or how much they stir their mixtures. Don't bring this up as groups are working. You can raise these distinctions with the whole group during the*	**How are you observing the salt?** We are using the hand lens to see the salt up close. **What did you learn by doing that?** We can see that there are different-size and different-shape particles in the dry salt.

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
			follow-up discussion about the importance of controlling variables across trials.	**What other tests are you going to do?** We are going to mix some salt with water. **Have you decided how much water and how much salt you will use?** Yes, we are going to use 100 mL of water and one spoonful of salt. **Why did you choose those amounts?**
10 min	**Follow-up to Activity 1** Synopsis: Groups compare results. Teacher asks questions to highlight differences in data collection procedures (quantity of salt, quantity of water, amount of mixing, etc.). Reach class consensus of methods for controlling variables and conducting trials. Main science idea: Properties are any traits of a material that can be measured.	Engage students in communicating in scientific ways. Engage students in analyzing and interpreting data and observations.	I'm so curious to hear from each group about what you all discovered about salt. Let's open a class discussion about your results. Remember our Communicating in Scientific Ways sentence stems for ideas about some ways scientists communicate as you all share and discuss one another's findings. You don't have to use these sentence stems, but you can if they help you explain your thinking. During this discussion we may practice #7 agree or disagree with others' ideas. Please remember to show respect and curiosity if you disagree with someone else's ideas. **What are some things you figured out with your tests?**	The salt was white before we put it in water, then it disappeared in the water.

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
			NOTE TO TEACHER: *The goal of this discussion is to surface discrepancies in the investigation results to talk about the need for standardization of procedures across groups. You might seed that conversation by saying something like,* What did you notice when you mixed the salt with the water? *Likely, some groups will say it's cloudy, some will say the salt sat on the bottom, and some will say the water became clear. Try to keep this discussion short and just hone in on different results that groups found. Then say something like,* I wonder what caused the different results among the groups. If we wanted to compare the results of all the groups to try to name some consistent observations, what might help us? *The point of these wonderings isn't to resolve the differences but to raise the question among students as to the importance of standardizing experimental procedures across groups. They should consider how differences among the groups may make it more difficult to accurately compare results. As fits with the conversation, introduce vocabulary such as* controlling variables, independent variables, *and* dependent variables. *If a student introduces any uncertainty about what happened to the salt, such as whether it's still there in the water, don't answer that*	**Did that make you wonder anything about the salt or the water?** Yeah, I wondered if the salt was still there or if it really vanished. **Can you write your wondering in the form of a question and add it to our DQB?** **What else did you figure out?** When we stirred our water, it was cloudy at first then turned clearer. **Did others find the same thing or different things?** Ours was cloudy at first but then a bunch of the salt just settled at the bottom. **Can you both bring your mixtures up to the front of class and let us see?** **I wonder why one group got one result and the other group got something different.** Maybe it is because they used different amounts. It looks like one group used more water. We decided to go to the sink and see if we could get warmer water to make it all disappear. **How much water and how much salt did you use?**

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
		Make explicit links between science ideas and activities (after activity).	*question at this point but have the student add that question to the Driving Question Board.* We've identified several different choices groups made in how they conducted their investigation with salt. None of these ways was incorrect, but we realized it makes it harder to compare our results when we all do the investigation differently. (*Highlight observations of two different groups. For example,* This group says the salt sits at the bottom, but this group says it disappears.) Your discussion about these differences captures some really important practices scientists try to use when conducting investigations. When scientists do the same investigation more than once, we call each of those a separate *trial*. If one person does the same investigation more than once, that would be multiple trials. If several groups do the same investigation once each, that's also multiple trials. When scientists do multiple trials, and if they find similar results repeated among their trials, that gives them a confidence about the accuracy of their results. When we continue our investigations during our next activity, if we can all use the same procedures, we will be able to compare our results. Now, let's come up with different testable variables that we really could investigate. **Does anyone have an idea for what we could change**	

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
			when mixing salt and water that we could turn into an investigation? ***NOTE TO TEACHER:*** *You may need to start this conversation off with one example to seed the discussion, but students should take it from there. Whenever a student suggests a testable investigation with salt and water, add it to a new chart paper. This will set up your work in Lesson 4. The ideas you really want to surface are temperature of the water, salt particle size, and stirring (speed of stirring and/or amount of stirring). You may need to bring them up if those ideas don't emerge naturally. If other ideas come up like amount of water, amount of salt, or other variables that wouldn't affect how salt dissolves, like size of the container, be sure to have students record those ideas as well for the DQB.*	We could change the temperature of the water. Size of the container. Amount of water. Size of the salt particles. We could change the amount of salt.
10 min	**Setup for Activity 2** Synopsis: Design a plan to investigate the five pollutants.	Make explicit links between science ideas and activities (after activity).	Now that we're thinking about following the same procedures so that we can compare results, let's think about how we want to investigate all five of our common pollutants. You'll be getting into five expert groups, and each group will focus on investigating one pollutant. **What are some of the things we want to control or keep the same across all our pollutant investigations?**	The amount of water.

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
			Those are all great ideas! Instead of writing out a plan step-by-step in words, we can show how we'll control the variables we listed among all our groups. We have an example (*show in PowerPoint*) of one way we could represent some of these ideas. I'll capture our ideas on the board for what we want to control as each group investigates their pollutant. **Who has an idea for the amount of one of our variables we should all control for and how I should represent that?** ***NOTE TO TEACHER:*** *On the board, model creating a visual procedure by drawing and labeling each variable. As students figure out how much of each pollutant and how much water to add, 10 mL of pollutant and 50–100 mL of water tends to work well. If it's more concentrated than that, you'll get into situations where not all the salt dissolves, or if it's less concentrated, you may not get the results to determine certain properties in Lesson 3 that will help you identify what's in the pond water in*	The amount of the pollutant. How much we stir it up. **Do you mean the number of times we stir it or how quickly we stir it? Either of those are variables we can change.** We could use 50/100 mL of water. We should all use one scoop of the pollutant. **How much of the pollutant would that be?** 10 mL

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
			Lesson 5. Split the class into 5 groups that you'll call "expert groups." After they're done working in their expert groups if there's time, you'll create "home groups" that will be made up of one student from each expert group. In home groups, they'll be able to discuss findings across all the pollutants. Now that we will all have the same procedure to follow, the only thing that will change among all the expert groups is which pollutant is being investigated. You are able to use the same materials your small group used to investigate salt. Remember, your group is recording observations about your pollutant and what you can observe about it by itself and when it's mixed with water. You have 10 minutes to get your materials, investigate your pollutant, to record your observations in your data table, and to clean up everything except your pollutant mixture. **Any questions before we begin?**	
10 min	**Activity 2** <u>Synopsis</u>: In expert groups, observe one pollutant and record observations. Do a gallery walk to look at each pollutant in and out of water.	Make explicit links between science ideas and activities (after activity).	***NOTE TO TEACHER:*** *Give the expert groups time to discuss and record observations for their pollutant out of water and mixed with water. They'll report their findings to the class. As you circulate among groups, you may want to encourage them to look at their mixture from the side and to capture whether the pollutant is spread evenly throughout the water. Some mixtures will be cloudy and spread evenly*	

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
			throughout, like detergent and fertilizer. The oil should float on top. The soil may have some bits floating at the top but most sunk to the bottom once the mixture settles. *They'll also want to record things like color and particle size when not mixed with water. Give teams 5–8 minutes for this step. When they're done, they should leave some of the unmixed pollutant and the pollutant mixed with water at the table for other groups to observe in a gallery walk.* Now that you all have captured your initial observations, we're going to do a quick gallery walk of the other pollutants.	
15 min	**Follow-up to Activity 2** <u>Synopsis</u>: Create a class consensus chart with observations.	Make explicit links between science ideas and activities (after activity). (Slide 8)	I'd love to hear what each group recorded as your observations about your pollutant. If anyone has clarifying questions for the groups, please ask those as we go through and share our observations. ***NOTE TO TEACHER:*** *The goal for this charting is to reach consensus around their observations about the mixtures of each pollutant and to add any other categories they think the data table should have to capture their significant learnings. This learning will lead to a list of* ***properties*** *of each pollutant you will want to capture on chart paper in a table like the one below as groups report their observations. If you are crunched for time, you can decide whether*	We learned that fertilizer makes the water blue. We noticed that the soap makes the water cloudy. We learned that the dirt didn't go through the filter, but as we walked around, it looks like other pollutants did go through the filter. We learned that oil floats on water.

<table>
<tr><th>Time</th><th>Phase of lesson and how the science content storyline develops</th><th>STeLLA strategy</th><th>Teacher talk and questions</th><th>Possible student and teacher dialogue</th></tr>
<tr><td></td><td></td><td></td><td>
you want all the students to also record all the properties. This process may take awhile if all students are writing down everything. If you decide to not have students write down everything, you may want to type up a master copy of the chart with the data from Lessons 2 and 3 and distribute to students to use in Lesson 5.
<table>
<tr><th colspan="3">(Leave this blank initially. The title will be “Properties” at the end of this discussion)</th></tr>
<tr><td colspan="3">(Leave this blank until you’ve defined the term properties. Then add this definition here: A property is a trait of a material that can be observed or measured and can be used to identify the material.)</td></tr>
<tr><td></td><td>Pollutant only</td><td>Pollutant mixed with water</td></tr>
<tr><td>Salt</td><td></td><td></td></tr>
<tr><td>Detergent</td><td></td><td></td></tr>
<tr><td>Oil</td><td></td><td></td></tr>
<tr><td>Fertilizer</td><td></td><td></td></tr>
<tr><td>Dirt</td><td></td><td></td></tr>
</table>
We have learned a lot during our investigations today. When we look at the information that we learned about the pollutants, we discovered properties of each pollutant. This is an important vocabulary word when we’re learning about different materials. I’ll add the definition to our class data table and title the table “Properties”.
</td><td></td></tr>
</table>

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
			Properties are any trait of a material that can be observed or measured. **For example, what properties did you discover today about our five pollutants?** Those are all excellent examples of the properties of each of the substances. Properties can be color, hardness, particle size, whether it disappears or spreads out evenly in water, whether it floats on water—so many of those ideas that you mentioned. One property you may have observed is when you stirred salt into the water. You noted that the salt was no longer visible. We'll talk more about this property during our next lesson. Scientists can use properties like you all discovered today to help identify materials. We will use the properties you developed today as we continue to investigate what might be in the pond water.	
5 min	**Summarize and Synthesize** <u>Synopsis</u>: Students create a model for what they imagine it would look like if they were to zoom in on their expert group's pollutant mixture.	Engage students in developing and using models and content representations. Engage students in making connections by synthesizing	As we did during our last lesson, I'd like you to capture how you're thinking about your mixture with the pollutant you focused on with your expert group. You'll create a model in your science notebook. Use a combination of words and sketches to show what you imagine you would see if you were to zoom *way*, *way* in on your expert group's pollutant-water mixture. Think about how to show in your zoomed-in model the	

Time	Phase of lesson and how the science content storyline develops	STeLLA strategy	Teacher talk and questions	Possible student and teacher dialogue
		and summarizing key science ideas. (Slide 11)	observations you made today. Please remember to show enough detail for someone to understand your thinking without talking to you. As you work on your model, if you realize your work today brought up any new questions for you, please add those to our Driving Question Board. ***NOTE TO TEACHER:*** *If you have time, you may want students to share their model with their home groups so they have an opportunity to see and think about how other people represented different pollutants.*	
1 min	**Link to Next Lesson** Synopsis: Teacher links science ideas to the next lesson.	Link science ideas to other science ideas (next lesson).	During our next lesson we'll continue to investigate these same focus questions and each of these five pollutants and their properties. While we made our initial observations of each today, next time we'll conduct some additional investigations to see if we can learn about more properties of each pollutant.	