

# RESPeCT Study-Group Sessions

## Study-Group Session 3

### Focus Questions





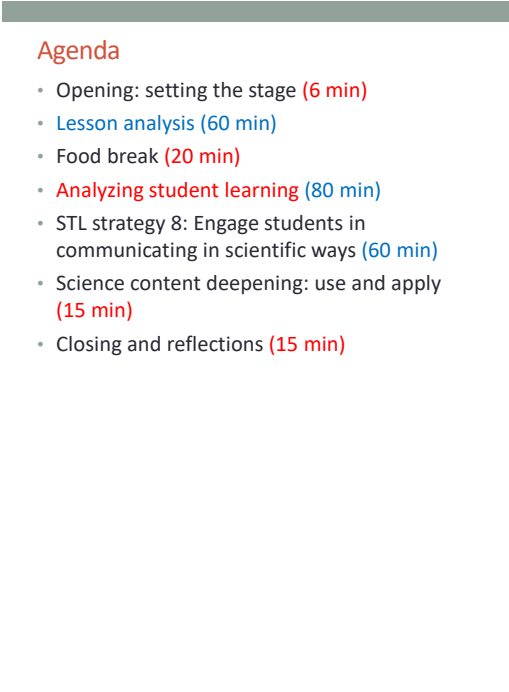
- What can we learn about the STeLLA strategies, science content, and student thinking by analyzing our own classroom videos?
- How can analysis of students’ pre- and posttests help us identify strengths and weaknesses in student learning and improve our teaching of the lessons?
- How can we support and challenge students to communicate in scientific ways (STeLLA strategy 8)?

### Overarching Learning Goals for All RESPeCT Study-Group Sessions



- Deepen teachers’ science-content knowledge and knowledge of effective science teaching.
- Develop teachers’ analytical skills to improve lesson-plan development and the teaching of science.
- Support teachers in the practical use of new knowledge and analytical skills in their own classrooms.
- Improve students’ science learning.
- Achieve sustainability by eventually reaching all K–6 teachers.

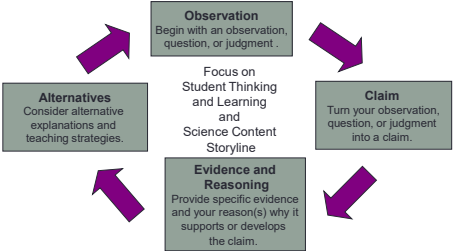
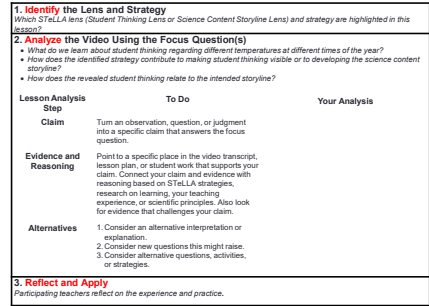
Preparation	Materials	Videos
<p><b>Ahead of Time</b></p> <ul style="list-style-type: none"> <li>• Review the PDLG and PowerPoints (PPTs) to plan the session. Modify text highlighted in <b>light-blue font</b> on slides and/or in PDLG to make it specific for your group. <b>Note:</b> More changes may be required in this session than in previous sessions if you have any remaining teacher video clips to analyze. Make sure to change the timing to fit the needs of your group.</li> <li>• To refresh your memory, review any classroom videos you will be analyzing during this session (carried over from Study Group 2).</li> <li>• Study all the materials related to strategy 8: Engage students in communicating in scientific ways (STeLLA strategies booklet, Tharp video clips, CSW lesson plan).</li> <li>• Identify a good use-and-apply question, scenario, data set, or phenomenon that will challenge participants to use and apply <b>content area 1</b> science ideas to explain a new situation. Consult with CPP faculty if you need suggestions.</li> <li>• Prepare charts (agenda, focus questions, learning goals, next steps) and make copies of handouts.</li> </ul> <p><b>On Meeting Day</b></p>	<p><b>Posters and Charts</b></p> <ul style="list-style-type: none"> <li>• STeLLA Framework and Strategies poster</li> <li>• Communicating in Scientific Ways (CSW) poster</li> <li>• Agenda (chart)</li> <li>• Focus Questions (chart)</li> <li>• Learning Goals for Today (chart)</li> <li>• Next Steps for Improving Student Learning (chart)</li> <li>• Norms for Working Together (chart)</li> <li>• Parking Lot poster</li> </ul> <p><b>Handouts</b></p> <ul style="list-style-type: none"> <li>• Transcript for each video clip (including Tharp video clips)</li> <li>• Lesson analysis protocol (LAP) for each video clip</li> <li>• <i>Optional:</i> Sample features analysis chart (FAC)—the Sun’s effect on climate—if not completed in SG 2</li> <li>• CSW lesson plan</li> <li>• Reflection sheet</li> </ul> <p><b>Supplies</b></p> <ul style="list-style-type: none"> <li>• Science-lesson materials kit (<b>content area 1</b>)</li> <li>• Chart paper and markers</li> <li>• Food</li> <li>• <i>Optional:</i> Hot plate and large beaker of water for boiling-water demonstration (or a video of the setup)</li> </ul> <p><b>Resources</b></p>	<ul style="list-style-type: none"> <li>• Video clip(s) of classroom teaching not analyzed during Study Group 2</li> </ul> <p><b>Communicating in Scientific Ways</b></p> <ul style="list-style-type: none"> <li>• Video clips 1–3, Graham Tharp classroom; stella2-05-224 C1-2; stella2-05-224 C3</li> <li>• Boiling-water video clip</li> </ul>

Preparation	Materials	Videos
<ul style="list-style-type: none"> <li>• Check audiovisual equipment and have video clips ready to go.</li> <li>• Arrange furniture and food.</li> <li>• Put up posters and charts.</li> </ul>	<ul style="list-style-type: none"> <li>• STeLLA strategies booklet</li> <li>• RESPeCT PD program binder</li> <li>• RESPeCT lesson plans binder</li> <li>• Content background document (<a href="#">content area 1</a>)</li> </ul>	

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
<p>6 min</p> <p><b>Setting the Stage for the Study-Group Session</b></p> <p>Slides 1–4</p>	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>To orient participants to the day’s agenda, focus questions, and learning goals</li> </ul>	 <p>RESPeCT STUDY-GROUP SESSION 3</p> <p>Date: _____</p> <p>  </p>	<p><b>Display Slide 1.</b> RESPeCT Study-Group Session 3 (1 min)</p> <ol style="list-style-type: none"> <li>Insert the correct date on the slide.</li> <li>Greet participants as they enter the room.</li> </ol>
		 <p><b>Agenda</b></p> <ul style="list-style-type: none"> <li>Opening: setting the stage (6 min)</li> <li>Lesson analysis (60 min)</li> <li>Food break (20 min)</li> <li>Analyzing student learning (80 min)</li> <li>STL strategy 8: Engage students in communicating in scientific ways (60 min)</li> <li>Science content deepening: use and apply (15 min)</li> <li>Closing and reflections (15 min)</li> </ul>	<p><b>Display Slide 2.</b> Agenda (2 min)</p> <ol style="list-style-type: none"> <li>Modify the slide to match the needs of your group. <ul style="list-style-type: none"> <li><b>Note:</b> Although the agenda assumes you have one remaining participant video clip to analyze during the session, you should have either finished all the analysis or have two teacher video clips left to analyze. This affects the timing for all other activities in this session. See the Planning and Leading Overview guide for tips on how to adjust the agenda and timing.</li> </ul> </li> <li>Share the agenda with the group.</li> <li>Remind participants that the majority of this study-group session will be devoted to lesson analysis.</li> <li>Ask participants if they have any questions about the agenda.</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p style="text-align: center;"><b>Today's Focus Questions</b></p> <ul style="list-style-type: none"> <li>• What can we learn about the STeLLA strategies, science content, and student thinking by analyzing our own classroom videos?</li> <li>• How can analysis of students' pre- and posttests help us identify strengths and weaknesses in student learning and improve our teaching of the lessons?</li> <li>• How can we support and challenge students to communicate in scientific ways (STeLLA strategy 8)?</li> </ul>	<p><b>Display Slide 3.</b> Today's Focus Questions (2 min)</p> <p>a. Share the focus questions and highlight how they relate to today's agenda.</p>
		<p style="text-align: center;"><b>Learning Goals for Today</b></p> <p>Today's work will deepen your understandings of the following:</p> <ul style="list-style-type: none"> <li>• STeLLA strategies and how they can be used in science teaching <ul style="list-style-type: none"> <li>• Strategy 8: Communicating in scientific ways List here any other STeLLA strategies that will be examined in the analysis of participant video clips (if you're including this in the session).</li> </ul> </li> <li>• Science-content ideas List here 1–3 science-content ideas that will be addressed during the video-clip analyses and/or during the use-and-apply activity at the end of the session.</li> </ul> <p>It will also strengthen your ability to analyze students' science learning.</p>	<p><b>Display Slide 4.</b> Learning Goals for Today (1 min)</p> <p>a. <b>Modify the slide to reflect the specific STeLLA strategies and science-content ideas you've identified for today's work.</b></p> <p>b. Share the learning goals with the group.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
60 min (Includes 20-min food break)  <b>Lesson Analysis</b>  Slides 5–11	<b>Purpose</b> <ul style="list-style-type: none"> <li>To deepen participants' understandings of the selected STeLLA strategies</li> <li>To deepen participants' science-content understandings</li> <li>To deepen participants' ability to analyze students' science thinking</li> </ul> <b>Content</b> <ul style="list-style-type: none"> <li>The STeLLA video-based lesson analysis process includes identifying the selected strategies (or missed opportunities) in the video clip and then analyzing the clip by making a claim, providing evidence and reasoning to support the claim, and proposing an alternative claim or alternative teaching approach.</li> <li>Analyzing video clips provides opportunities to deepen participants'</li> </ul>	 <p><b>Lesson Analysis</b></p> <p>Now we'll begin the lesson analysis process for the video clip.</p>	<b>Display Slide 5.</b> Lesson Analysis (Less than 1 min) <ol style="list-style-type: none"> <li>If you aren't analyzing any teacher video clips today, delete slides 5–12 and adjust the timing for each of the remaining activities.</li> <li>If you're analyzing two teacher video clips, duplicate slides 5–12 and shorten the time for each video analysis and the remaining activities.</li> <li>"Now we'll begin the lesson analysis process for the video clip."</li> </ol>
		 <p><b>Lesson Analysis Process</b></p> <ol style="list-style-type: none"> <li><b>Review</b> the lesson context:           <ul style="list-style-type: none"> <li>What is the ideal student response to the focus question?</li> <li>How is the clip situated in the content storyline?</li> </ul> </li> <li><b>Identify</b> and discuss the strategy that is the focus of analysis for each clip.</li> <li><b>Watch</b> video clip(s).</li> <li><b>Analyze</b> the lesson using the lesson analysis protocol.</li> <li><b>Reflect</b> on the lesson analysis experience:           <ul style="list-style-type: none"> <li>As a reviewer</li> <li>As a teacher in the clip</li> </ul> </li> </ol>	<b>Display Slide 6.</b> Lesson Analysis Process (Less than 1 min) <ol style="list-style-type: none"> <li>Remind participants of the process they'll be using when they view the video clip.</li> <li>"The focus of this analysis is on student thinking, science ideas, and a specific STeLLA strategy."</li> <li>Emphasize that the goal is to understand how the appropriate use of the STeLLA strategies will support students in learning challenging science ideas and scientific ways of thinking.</li> </ol>

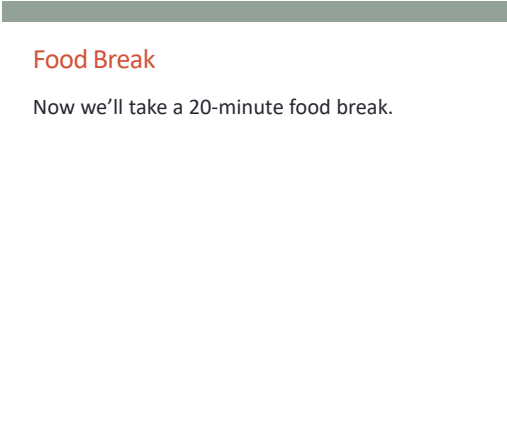
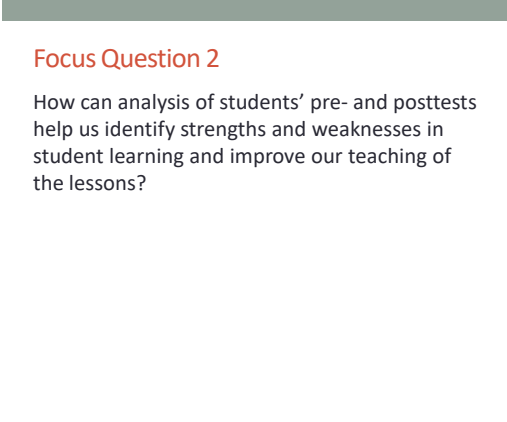
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process												
	<p>understandings of the selected STeLLA strategies.</p> <ul style="list-style-type: none"> <li>Analyzing video clips provides opportunities to deepen participants' understandings of science-content ideas featured in the selected clips.</li> </ul> <p><b>What Participants Do</b></p> <ul style="list-style-type: none"> <li>Use the STeLLA lesson analysis process with the accompanying lesson analysis protocol (LAP) to support participants' analyses of classroom science teaching and learning in one remaining video clip.</li> </ul> <p><b>Videos/Transcripts</b></p> <ul style="list-style-type: none"> <li>Video clip carried over from Study Group 2</li> <li>Video transcript and LAP</li> </ul>	<p><b>The CERA Framework</b></p> 	<p><b>Display Slide 7.</b> The CERA Framework (Less than 1 min)</p> <p>a. “We’ll be using the CERA framework again during this lesson analysis. CERA involves (1) making a claim based on an observation, (2) providing evidence and reasoning to support the claim, and (3) considering alternative interpretations or teaching strategies to address missed opportunities.”</p> <p>b. Reasoning should address why the claim and evidence are significant. For example, what does the claim reveal about student difficulties with the science content or the importance of the strategy being implemented? Participants might use these sentence starters when formulating claim, evidence, and reasoning statements:</p> <ul style="list-style-type: none"> <li>“My claim is ...”</li> <li>“My evidence is ... because ...”</li> <li>“This is important because ...”</li> </ul> <p>c. Remind participants that in addition to using the CERA framework to analyze their own science teaching in these study-group sessions, they will use it in the classroom as a tool for teaching students how to develop scientific explanations and arguments (STeLLA strategy 5).</p>												
		<p><b>Lesson Analysis Protocol for the Video Clip</b></p>  <table border="1" data-bbox="741 1166 1167 1382"> <thead> <tr> <th>Lesson Analysis Step</th> <th>To Do</th> <th>Your Analysis</th> </tr> </thead> <tbody> <tr> <td>Claim</td> <td>Turn an observation, question, or judgment into a specific claim that answers the focus question.</td> <td></td> </tr> <tr> <td>Evidence and Reasoning</td> <td>Point to a specific place in the video transcript, lesson plan, or student work that supports your claim. Connect your claim and evidence with reasoning based on STeLLA strategies, research on learning, your teaching experience, or scientific principles. Also look for evidence that challenges your claim.</td> <td></td> </tr> <tr> <td>Alternatives</td> <td>1. Consider an alternative interpretation or explanation. 2. Consider new questions this might raise. 3. Consider alternative questions, activities, or strategies.</td> <td></td> </tr> </tbody> </table>	Lesson Analysis Step	To Do	Your Analysis	Claim	Turn an observation, question, or judgment into a specific claim that answers the focus question.		Evidence and Reasoning	Point to a specific place in the video transcript, lesson plan, or student work that supports your claim. Connect your claim and evidence with reasoning based on STeLLA strategies, research on learning, your teaching experience, or scientific principles. Also look for evidence that challenges your claim.		Alternatives	1. Consider an alternative interpretation or explanation. 2. Consider new questions this might raise. 3. Consider alternative questions, activities, or strategies.		<p><b>Display Slide 8.</b> Lesson Analysis Protocol (Less than 1 min)</p> <p>a. Replace the LAP image on the slide with an image of the LAP you will be using for this session.</p> <p>b. Have participants locate the LAP they will be using for the video clip.</p> <p>c. Draw participants' attention to the <b>Identify</b> and <b>Analyze</b> questions for this analysis.</p>
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Claim	Turn an observation, question, or judgment into a specific claim that answers the focus question.														
Evidence and Reasoning	Point to a specific place in the video transcript, lesson plan, or student work that supports your claim. Connect your claim and evidence with reasoning based on STeLLA strategies, research on learning, your teaching experience, or scientific principles. Also look for evidence that challenges your claim.														
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		<p><b>Lesson Analysis: Review Lesson Context</b></p> <p>Main learning goal:</p> <p>Focus question:</p> <p>Main lesson activity:</p> <p>Review the lesson plan overview page:</p> <ul style="list-style-type: none"> <li>What important science ideas should students get from this lesson?</li> <li>What are the ideal student responses to the focus question?</li> </ul> <p>Context of the video clip:</p>	<p><b>Display Slide 9.</b> Lesson Analysis: <b>Review</b> Lesson Context (4 min)</p> <ol style="list-style-type: none"> <li>Modify the slide for this video clip. All of the information may not fit on one slide.</li> <li><b>Review</b> the context for the video clip that will be analyzed. Some participants may need help getting their heads back into the featured lesson if they haven't taught the lessons yet.</li> <li>Remind participants of the main learning goal, the focus question, and the main activity in this lesson.</li> <li><b>Optional:</b> Direct participants to look at the overview page of the lesson plan to identify important science ideas and an ideal student response to the focus question.</li> <li>Orient participants to where the video clip appears in the lesson.</li> <li>Ask the teacher whose clip you will be analyzing to add other contextual factors that may be pertinent to the upcoming analysis.</li> </ol>
		<p><b>Lesson Analysis: Identify the Strategy</b></p> <ol style="list-style-type: none"> <li>Review the lesson context.</li> <li><b>Identify the strategy:</b> <ul style="list-style-type: none"> <li>Add here the strategy that is the focus of the analysis for the video clip. Add page numbers for the strategy from the STeLLA strategies booklet.</li> <li>Add here the identification question you wrote on the LAP. An example of an identification question is "What clear examples of probe and challenge questions can you identify in this clip?"</li> </ul> </li> <li>Watch the video clip(s).</li> <li>Analyze the video using the lesson analysis protocol.</li> <li>Reflect on the lesson analysis experience.</li> </ol>	<p><b>Display Slide 10.</b> Lesson Analysis: <b>Identify</b> the Strategy (15 min)</p> <ol style="list-style-type: none"> <li>Modify the slide to match your lesson analysis plan for the video clip.</li> <li>Highlight step 1 on the LAP (<b>Identify</b> the strategy) and emphasize the strategy participants will be focusing on during this analysis. <p><b>Note:</b> Remind participants that step 1 on the LAP is step 2 of the lesson analysis process shown on the slide.</p> </li> <li>Review the purpose(s) and key features of the selected strategy. Have participants skim the relevant content in the STeLLA strategies booklet and/or refer to their Z-fold summary charts. Then have participants share the</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>purpose(s) and key features of the selected strategy.</p> <p>d. Show the video clip.</p> <p>e. <b>Individuals:</b> Have participants study the video transcript to identify clear examples of the selected strategy.</p> <p>f. <b>Whole group:</b> “What examples of the strategy did you find in the video clip?” Ask challenge questions to make sure participants understand the strategy:</p> <ul style="list-style-type: none"> <li>• “What makes this an example of strategy X?”</li> <li>• “Can you point to text in the strategies booklet that clarifies why this is an example of strategy X?”</li> </ul> <p><b>Note 1:</b> Encourage the teacher who is featured in the video to listen to and observe this discussion, not to participate.</p> <p><b>Note 2:</b> In assessing participants’ understandings of the strategy, pay attention to their reasoning. Are they clear about the purpose(s) of the strategy and how it is different from other strategies?</p>
		<div style="background-color: #d9ead3; padding: 5px; margin-bottom: 10px;"><b>Lesson Analysis: Analyze the Video</b></div> <ol style="list-style-type: none"> <li>1. Review the lesson context.</li> <li>2. Identify the strategy.</li> <li>3. Watch the video clip(s).</li> <li>4. <b>Analyze</b> the video using the lesson analysis protocol. Make a claim and support with evidence. <ul style="list-style-type: none"> <li>• Add analysis questions here. Examples include the following: <ul style="list-style-type: none"> <li>• What do students seem to understand (or not) about temperature patterns on Earth and the Sun’s effect on climate and seasons?</li> <li>• How did the use of the identified strategy make student thinking more visible?</li> </ul> </li> </ul> </li> <li>5. Reflect on the lesson analysis experience.</li> </ol>	<p><b>Display Slide 11.</b> Lesson Analysis: <b>Analyze</b> the Video (15 min)</p> <p>a. <b>Add analysis questions to the slide.</b></p> <p>b. Direct participants to step 2 of the LAP (<b>Analyze</b> the video).</p> <p style="padding-left: 40px;"><b>Note:</b> Remind participants that step 2 on the LAP is step 4 of the lesson analysis process shown on the slide.</p> <p>c. <b>If relevant:</b> Notice that there are two analysis questions on the slide. You may choose which one you want to address.</p> <p>d. If time allows, have participants watch the video clip a second time.</p> <p>e. <b>Individuals:</b> Give participants time to study the video transcript; generate their claim, evidence, and reasoning; and come up with alternatives (CERA) once they watch the video.</p> <p>f. <b>Whole group:</b> Have participants share their CERAs with</p>



PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>the group, noting similarities and differences that ensure a rich and fruitful dialogue regarding student thinking, the use of the STeLLA strategies, and the science content.</p> <p><b>Note 1:</b> Encourage the teacher who was featured in the video clip to listen to and observe this analysis discussion, not to participate.</p> <p><b>Note 2:</b> Be sure to listen to participants as they share their understandings of the STeLLA strategies and science content. Ask probe questions that will encourage participants to share their ideas more clearly and precisely. If confusion or lack of understanding emerges, point participants back to the STeLLA resources (e.g., the video transcript, the content background document, the STeLLA strategies booklet, and the lesson plans binder).</p>
		<div style="background-color: #cccccc; height: 10px; margin-bottom: 5px;"></div> <p><b>Lesson Analysis: Reflect</b></p> <ol style="list-style-type: none"> <li>1. Review the lesson context.</li> <li>2. Identify the strategy.</li> <li>3. Watch the video clip(s).</li> <li>4. Analyze the video using the lesson analysis protocol. Make a claim and support with evidence.</li> <li>5. <b>Reflect on the lesson analysis experience:</b> <ul style="list-style-type: none"> <li>• What did you learn from the experience?</li> </ul> </li> </ol>	<p><b>Display Slide 12.</b> Lesson Analysis: <b>Reflect</b> (5 min)</p> <p>a. <b>Individuals:</b> Give participants time to reflect on and write about (if time allows) what they've learned through this analysis process.</p> <p>b. <b>Whole group:</b> Ask participants to share what they've learned, starting with the teacher whose video was analyzed. Keep them focused on what they learned about the target strategy, the science content, or the students' challenges in understanding the content, not on what they did wrong.</p> <p><b>Note:</b> If time is running short, ask only the teacher whose video was analyzed to share her or his reflection.</p>

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		 <p><b>Food Break</b></p> <p>Now we'll take a 20-minute food break.</p>	<p><b>Display Slide 13.</b> Food Break (20 min)</p> <p>a. <a href="#">Decide when to schedule the food break and rearrange the slides accordingly. The break should occur approximately halfway through the session.</a></p> <p><b>Note:</b> This will be too early for a break unless you're analyzing two video clips.</p>
<p>80 min</p> <p><b>Analyzing Student Learning</b></p> <p>Slides 12–19</p>	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>To analyze the science learning of participants' students</li> <li>To deepen participants' understandings of the science content featured in the assessment task</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>The features analysis chart (FAC) supports analysis of students' responses to</li> </ul>	 <p><b>Focus Question 2</b></p> <p>How can analysis of students' pre- and posttests help us identify strengths and weaknesses in student learning and improve our teaching of the lessons?</p>	<p><b>Display Slide 14.</b> Focus Question 2 (Less than 1 min)</p> <p>a. <b>Transition:</b> This slide marks the transition to the student pre- and posttest analysis.</p> <p>b. Read the focus question on the slide.</p>

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	<p>open-ended assessment items by identifying which specific science ideas and misconceptions are present in each student's response.</p> <ul style="list-style-type: none"> <li>The completed FAC for all students in the class provides a quick snapshot that helps teachers identify which ideas most students are grasping and which ideas remain problematic.</li> <li>Comparing pre- and posttest FACs enables teachers to identify areas of growth and areas needing further attention.</li> <li>Using the features analysis chart to analyze students' written responses to open-ended assessment items provides opportunities for deepening participants' understandings of science-content ideas featured in the assessment task.</li> </ul> <p><b>What Participants Do</b></p> <ul style="list-style-type: none"> <li>Assess student learning by studying and comparing their students' work on the lesson pre- and posttests.</li> <li>Pair up to study and compare completed features analysis charts (FACs) and sample student tests and construct a summary chart of strengths and weaknesses in students'</li> </ul>	<p><b>Practice Using a Sample Features Analysis Chart to Analyze Student Learning</b></p> <p>Look at the completed sample features analysis charts (pre and post) for a test question about the Sun's effect on climate (5th or 6th grade):</p> <ol style="list-style-type: none"> <li>What can you say about what student 6 learned?</li> <li>What can you say about what student 11 learned?</li> <li>Look at the results for the class as a whole: <ul style="list-style-type: none"> <li>What can you say about the strengths in students' learning about why South America experiences summer in January?</li> <li>What can you say about any weaknesses in students' learning?</li> </ul> </li> </ol>	<p><b>Display Slide 15.</b> Practice Using a Sample Features Analysis Chart to Analyze Student Learning (10 min)</p> <p><b>Note:</b> Skip this slide if you used it in Study Group 2.</p> <ol style="list-style-type: none"> <li>"Before we look at our own features analysis charts to analyze our students' learning, let's practice using a sample FAC to see how it can be used to identify patterns in student learning."</li> <li>Have participants locate the sample FAC for a test question about the Sun's effect on climate used in 5th- and 6th-grade classrooms.</li> <li>Make sure participants see both the pre- and posttest results for a class of 25 students.</li> <li><b>Individuals:</b> Have participants answer the questions on the slide.</li> <li><b>Whole group:</b> Discuss participants' responses to each question.</li> </ol> <p><b>Anticipated responses:</b></p> <ol style="list-style-type: none"> <li><b>Student 6</b> didn't use any of the intended science ideas in answering this question on the pretest; instead, the student indicated incorrectly that the equator is always the warmest place on Earth, so South America is always hot. The student's thinking changed quite a bit on the posttest, where she/he used three of the goal science ideas and no longer used the explanation that the equator is always the hottest place on Earth.</li> <li><b>Student 11</b> also initially thought that it's hot in January in South America because the equator is there, and that it's always hot at the equator. On the posttest, the student still held on to this idea but also picked up a new idea that the Earth is tilted. The student has not yet figured out how to use the new idea of the tilted Earth to change her/his idea that the equator is always the hottest place.</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	<p>learning.</p> <ul style="list-style-type: none"> <li>• Look at each other’s charts and discuss general conclusions about student learning.</li> <li>• Consider how changes to the lesson plans or additional lessons might help address the weaknesses in student learning.</li> </ul>	<p><b>Analysis of Student Learning: Features Analysis Charts</b></p> <ol style="list-style-type: none"> <li>1. Break up into groups of three and distribute FACs to each group member.</li> <li>2. <b>Individuals:</b> Study each teacher’s pre- and posttest FACs, looking for patterns in the student-learning data. Note the following: <ul style="list-style-type: none"> <li>• What ideas did students seem to get (pre and post)?</li> <li>• What ideas did students <b>not</b> seem to get (pre and post)?</li> <li>• How did student learning change from pre- to posttest?</li> </ul> </li> <li>3. <b>Small group:</b> <ul style="list-style-type: none"> <li>• Identify a note taker for the group.</li> <li>• Discuss and take notes about things that were similar and different across classes.</li> <li>• Be sure to cite evidence for your claims!</li> </ul> </li> </ol>	<p>3. Results for the class overall:</p> <ul style="list-style-type: none"> <li>• <b>Strengths:</b> On the posttest, most students are now using ideas about the Earth’s tilt and the importance of direct Sun rays to explain why it is hot in January in South America. In addition, six out of 13 students dropped the misconception that the reason is that the equator is always the warmest place on Earth.</li> <li>• <b>Weaknesses:</b> Seven out of 13 students are still using the idea that the equator is always the hottest place on Earth, and that’s why it’s hot in South America. Only a few students are using ideas about hours of daylight (the last two goal features) in their explanations.</li> </ul> <p><b>Display Slide 16.</b> Analysis of Student Learning: Features Analysis Charts (20 min)</p> <ol style="list-style-type: none"> <li>a. Have participants break up into groups of three. (2 min)</li> <li>b. Go over the directions on the slide. Emphasize the importance of evidence-based reasoning. Participants should challenge one another to give evidence for their claims. (2 min)</li> <li>c. “Within your group, distribute copies of the pre- and posttest FACs.” (2 min)</li> <li>d. <b>Individuals (7 min):</b> “Study each teacher’s pre- and posttest FACs, looking for patterns in the student-learning data.”</li> <li>e. <b>Small groups (7 min):</b> <ul style="list-style-type: none"> <li>• “Identify a note taker for the group.”</li> <li>• “Discuss and take notes about things that were similar and different across classes.”</li> <li>• “Be sure to cite evidence for your claims!”</li> </ul> </li> </ol> <p><b>Note:</b> If needed to balance out group sizes, join one group as a participant. Otherwise, join a group of three, mainly as an</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="743 399 1163 448"><b>Analysis of Student Learning: Sample Pre- and Posttests</b></p> <ol data-bbox="743 461 1178 727" style="list-style-type: none"> <li data-bbox="743 461 1178 500">1. Distribute copies of sample student pre- and posttests in your small group.</li> <li data-bbox="743 506 1178 604">2. <b>Individuals:</b> Study each student's pre- and posttests. Note the following: <ul data-bbox="772 548 1163 604" style="list-style-type: none"> <li data-bbox="772 548 1136 568">• What ideas did students seem to get (pre and post)?</li> <li data-bbox="772 571 1163 591">• What ideas did students <b>not</b> seem to get (pre and post)?</li> <li data-bbox="772 594 1163 604">• How did student learning change from pre- to posttest?</li> </ul> </li> <li data-bbox="743 610 1178 727">3. <b>Small group:</b> <ul data-bbox="772 636 1178 727" style="list-style-type: none"> <li data-bbox="772 636 1016 656">• Identify a note taker for the group.</li> <li data-bbox="772 659 1178 708">• Discuss and take notes about interesting student thinking found in the individual tests, looking for anything that reinforces or differs from the patterns identified in the FAC.</li> <li data-bbox="772 711 1079 727">• Remember to cite evidence for your claims!</li> </ul> </li> </ol>	<p data-bbox="1251 246 1961 334">observer, but feel free to ask questions that challenge participants to dig deeper and more specifically into the data and cite evidence for claims.</p> <p data-bbox="1251 370 1969 428"><b>Display Slide 17.</b> Analysis of Student Learning: Sample Pre- and Posttests (15 min)</p> <p data-bbox="1251 480 1906 539"><b>Note:</b> If time is short, have participants analyze only the posttests.</p> <ol data-bbox="1251 558 1961 967" style="list-style-type: none"> <li data-bbox="1251 558 1940 610">a. In the same small groups, have participants distribute copies of the sample student pre- and posttests. (1 min)</li> <li data-bbox="1251 636 1961 721">b. <b>Individuals (7 min):</b> Have participants review the tests from other teachers, studying how each student did on the pretest and posttest.</li> <li data-bbox="1251 740 1915 967">c. <b>Small groups (7 min):</b> <ul data-bbox="1297 786 1915 967" style="list-style-type: none"> <li data-bbox="1297 786 1583 812">• “Identify a note taker.”</li> <li data-bbox="1297 815 1915 935">• “Discuss and take notes about interesting student thinking found in the individual tests, looking for anything that reinforces or differs from patterns identified in the FAC.”</li> <li data-bbox="1297 938 1856 964">• “Remember to cite evidence for your claims!”</li> </ul> </li> </ol> <p data-bbox="1251 987 1974 1130"><b>Note:</b> If needed to balance out group sizes, join one group as a participant. Otherwise, join a new group, mainly as an observer, but feel free to ask questions that challenge participants to dig deeper and more specifically into the data and cite evidence for claims.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process																								
		<div style="background-color: #808080; color: white; padding: 2px; margin-bottom: 10px;">Analysis of Student Learning: Charts</div> <p style="color: #C00000; margin: 0;"><b>Analysis of Student Learning: Charts</b></p> <p>Make a chart that shows the following:</p> <ul style="list-style-type: none"> <li>• Ideas most students seemed to understand</li> <li>• Ideas most students seemed to <b>not</b> understand</li> <li>• General changes in student understanding you observed</li> </ul>	<p><b>Display Slide 18.</b> Analysis of Student Learning: Charts (15 min)</p> <ol style="list-style-type: none"> <li>a. Direct each of the small groups to use what they've learned from their analyses of the FACs and the sample student work to construct a chart showing strengths, weaknesses, and changes in student learning.</li> <li>b. The next slide shows the chart structure they should use</li> <li>c. Wander around the room and observe the groups working on their charts.</li> <li>d. Encourage participants to be specific about the ideas students seemed to understand or didn't seem to understand.</li> <li>e. Time this analysis work and give small groups a 5-minute warning before the end of the activity.</li> </ol>																								
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #003366; color: white;">Seemed to Get (Pre)</th> <th style="background-color: #808080; color: white;">Didn't Get (Pre)</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr> <th style="background-color: #003366; color: white;">Seemed to Get (Post)</th> <th style="background-color: #808080; color: white;">Didn't Get (Post)</th> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr> <th colspan="2" style="background-color: #003366; color: white;">Changes in Understanding</th> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	Seemed to Get (Pre)	Didn't Get (Pre)							Seemed to Get (Post)	Didn't Get (Post)							Changes in Understanding								<p><b>Display Slide 19.</b> Analysis Chart Structure (Time combined with slide 16)</p> <ol style="list-style-type: none"> <li>a. Point out the chart structure on the slide that participants will use to create their charts.</li> </ol>
Seemed to Get (Pre)	Didn't Get (Pre)																										
Seemed to Get (Post)	Didn't Get (Post)																										
Changes in Understanding																											

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p><b>Gallery Walk</b></p> <ol style="list-style-type: none"> <li>Walk around the room and look at all the charts.</li> <li>Note the following: <ul style="list-style-type: none"> <li>Similar things students seemed to understand</li> <li>Similar things students seemed to be struggling with</li> </ul> </li> </ol>	<p><b>Display Slide 20.</b> Gallery Walk (5 min)</p> <ol style="list-style-type: none"> <li>Have participants walk around the room and look at one another's charts, noting the similarities in what students seemed to understand and what they seemed to be struggling with. Coordinate the gallery walk so that participants don't gather around the same chart at the same time.</li> <li>Review all the charts and identify clarification questions you want to ask during the whole-group discussion. If participants start discussing the charts while they're walking around, decide whether you'll join in or ask them to wait until the group discussion. (If you decide to join in the discussion, you may want to switch quickly to the next slide to provide focus.)</li> </ol>
		<p><b>Discussion</b></p> <ol style="list-style-type: none"> <li>What did our gallery walk tell you about what students learned and understood?</li> <li>What does our analysis suggest about next steps? <ul style="list-style-type: none"> <li>What additional experiences/lessons do students need?</li> <li>How could the lessons be improved to better support student learning?</li> <li>What STeLLA strategies do teachers/students need more work with?</li> <li>What will you do differently next time you teach these lessons?</li> </ul> </li> </ol>	<p><b>Display Slide 21.</b> Discussion (15 min)</p> <ol style="list-style-type: none"> <li>Reveal only the first question on the slide and follow this pattern as you lead the discussion: <ul style="list-style-type: none"> <li><b>Clarification questions:</b> Model asking clarification questions and encourage participants to ask about anything they saw on the charts that wasn't clear.</li> <li><b>Individual think time:</b> "What do you think students generally understood?"</li> <li><b>Whole-group share-out.</b></li> <li><b>Individual think time:</b> "What do you think students generally struggled with?"</li> <li><b>Whole-group share-out.</b></li> </ul> </li> <li>Reveal the second set of questions on the slide.</li> <li>"Now let's think about how we can address the weaknesses and gaps in student learning that we've identified."</li> <li><b>Individuals:</b> "Read and think about these four next-steps questions. Taking notes will help you remember the ideas</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>you generate.”</p> <p>e. <b>Whole-group share-out:</b> Discuss the ideas participants have generated.</p> <p><b>Note:</b> Create a chart titled Next Steps for Student Learning and take notes as participants share their ideas.</p>
<p>60 min</p> <p><b>STL Strategy 8: Engage Students in Communicating in Scientific Ways</b></p> <p>Slides 20–25</p>	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>To introduce participants to STL strategy 8: Engage students in communicating in scientific ways (CSW)</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>Student Thinking Lens (STL) strategy 8—engage students in communicating in scientific ways—involves teaching students about specific scientific practices they can use in their thinking, acting, talking, and reasoning.</li> </ul> <p><b>What Participants Do</b></p> <ul style="list-style-type: none"> <li>Identify the purpose and key features of strategy 8.</li> <li>Practice using this strategy as they observe boiling water.</li> <li>Analyze a video clip of a 5th-grade class as students are introduced to communicating in scientific ways.</li> <li>Study a lesson plan (focused on boiling-water observations) they’ll use to introduce students to ways</li> </ul>	<p><b>Focus Question 3: A New STL Strategy</b></p> <p>How can we support and challenge students to communicate in scientific ways (STeLLA strategy 8)?</p> <hr/> <p><b>STL Strategy 8: Communicating in Scientific Ways</b></p> <ol style="list-style-type: none"> <li>Read about strategy 8 in the STeLLA strategies booklet: Engage students in communicating in scientific ways. <ul style="list-style-type: none"> <li>What is the purpose of this strategy?</li> <li>What are the key features of this strategy?</li> </ul> </li> <li>Be prepared to share with the group.</li> </ol>	<p><b>Display Slide 22.</b> Focus Question 3: A New STL Strategy (Less than 1 min)</p> <ol style="list-style-type: none"> <li>This slide marks the transition to STL strategy 8.</li> <li>Read the focus question.</li> </ol> <p><b>Note:</b> In this segment (and the lesson plan that participants will use to introduce their students to communicating in scientific ways), you have the option of using either an actual boiling-water demonstration or a video of this setup. <b>If you’re using the actual demonstration, turn on the hot plate at this point.</b></p> <p><b>Display Slide 23.</b> STL Strategy 8: Communicating in Scientific Ways (15 min)</p> <ol style="list-style-type: none"> <li><b>Individuals:</b> Have participants read strategy 8 in the STeLLA strategies booklet and complete their Z-fold summary charts (summer binder, week 1). (Participants who don’t have their Z-fold charts can take notes on a piece of paper.)</li> <li><b>Whole group:</b> Have one person (you or a participant) take notes on chart paper as the group discusses the purpose and key features of strategy 8.</li> <li>Distribute Communicating in Scientific Ways (CSW) posters for participants to use in their classrooms.</li> </ol>



PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	of communicating scientifically.		
		<p style="text-align: center;"><b>A Common Experience</b></p> <p>What do you think is happening with the water in the beaker? Why?</p>	<p><b>Display Slide 24.</b> A Common Experience (10 min)</p> <ol style="list-style-type: none"> <li>Have participants observe water boiling in a beaker on a hot plate (either the actual setup or a video of the setup).</li> <li>Have participants practice using the sentence starters on the Communicating in Scientific Ways poster.</li> <li>Encourage participants to use sentence starters from each category on the poster. Check off sentence starters as you hear them being used, and encourage participants to use new categories by asking questions like “Can anyone use a sentence starter from category 7, ‘Listen to others’ ideas and ask clarifying questions’?”</li> <li>At the end of this experience, ask participants how well they think they did with using the sentence starters. How do they think this approach would help reveal student thinking?</li> <li>Transition to the next slide by saying, “Now we’ll watch a couple of video clips of another teacher using this strategy with his students.”</li> </ol>
		<p style="text-align: center;"><b>Lesson Analysis: Tharp CSW Video Clips 1 and 2</b></p> <ol style="list-style-type: none"> <li><b>Identify</b> <ul style="list-style-type: none"> <li>Identify instances in the video clips where students are communicating in scientific ways.</li> </ul> </li> <li><b>Analyze</b> <ul style="list-style-type: none"> <li>What student thinking is made visible through communicating in scientific ways?</li> <li>What did the teacher do to scaffold or support students in communicating in scientific ways?</li> </ul> </li> <li><b>Reflect</b> <ul style="list-style-type: none"> <li>What aspects of scientific communication do you think will be new for your students?</li> <li>Which aspects of scientific communication do you think will be difficult for them?</li> </ul> <p style="text-align: center;"><a href="#">Link to Tharp video clips 1 and 2: stella2-05-224 C1-2</a></p> </li> </ol>	<p><b>Display Slide 25.</b> Lesson Analysis: Tharp CSW Video Clips 1 and 2 (15 min)</p> <ol style="list-style-type: none"> <li>Have participants locate the transcripts for Tharp video clips 1 and 2.</li> <li><b>Emphasize:</b> “We won’t be using a written lesson analysis protocol in this instance, but we will be using the same general process, guided by the questions on the slide.</li> <li><b>Whole-group discussion:</b> <ul style="list-style-type: none"> <li>Start with the <b>Identify</b> question. (Hide the other questions on the slide.)</li> <li>Then reveal the <b>Analyze</b> questions and discuss them.</li> </ul> </li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<ul style="list-style-type: none"> <li>Finally, reveal the <b>Reflect</b> questions and discuss them.</li> </ul>
		<p><b>Lesson Analysis: Tharp CSW Video Clip 3</b></p> <ol style="list-style-type: none"> <li>Tharp’s students were asked to reflect on these questions: <ul style="list-style-type: none"> <li>What did you learn today about how to think and talk like a scientist?</li> <li>What was an idea that was new for you?</li> </ul> </li> <li>Now think about <b>your</b> students and answer this reflection question: <ul style="list-style-type: none"> <li>What do you think or hope they will be able to say in response to these questions?</li> </ul> <p style="text-align: center;"><a href="#">Link to Tharp video clip 3: stella2-05-224 C3</a></p> </li> </ol>	<p><b>Display Slide 26.</b> Lesson Analysis: Tharp CSW Video Clip 3 (5 min)</p> <ol style="list-style-type: none"> <li>“Now let’s look at another clip from Mr. Tharp’s class. His students are responding to the following reflection questions at the end of the lesson: <ul style="list-style-type: none"> <li>“What did you learn today about how to think and talk like a scientist?”</li> <li>“What was an idea that was new for you?”</li> </ul> </li> <li>“Next, think about your own students. What do you think or hope they will say in response to these questions?”</li> </ol>
		<p><b>Introducing CSW to Your Students: Review the Lesson Plan</b></p> <ol style="list-style-type: none"> <li>What is the main learning goal?</li> <li>What activities address this main learning goal?</li> <li>What do you hope/expect to see students write in response to these final reflection questions? <ul style="list-style-type: none"> <li><i>What did you learn today about how to think and talk like a scientist?</i></li> <li><i>What was an idea that was new for you?</i></li> </ul> </li> <li>Teach this lesson before teaching the RESPeCT lessons that are scheduled in the spring (<a href="#">add the name of content area 2 here</a>).</li> </ol>	<p><b>Display Slide 27.</b> Introducing CSW to Your Students: Review the Lesson Plan (15 min)</p> <ol style="list-style-type: none"> <li>Let participants know that before teaching the lessons in <a href="#">content area 2</a>, you’d like them to teach the CSW lesson, introducing their students to strategy 8. Then students can practice using the strategy throughout the new lesson sequence. <p><b>Note:</b> Participants may want to give a copy of the CSW sentence starters to each of their students in addition to hanging the poster in their classrooms.</p> </li> <li><b>Individuals:</b> Have participants review the lesson plan, focusing on the overview page and lesson outline.</li> <li><b>Whole group:</b> Discuss the questions on the slide.</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
<p>15 min</p> <p><b>Science Content Deepening: Use and Apply</b></p> <p>Slide 26</p>	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>To deepen participants' science-content understandings</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>List the specific science ideas that will be needed to answer the use-and-apply question or explain the scenario, data, or phenomenon described on the slide.</li> </ul> <p><b>What Participants Do</b></p> <ul style="list-style-type: none"> <li>Work individually and then as a group on a use-and-apply question, scenario, data set, or phenomenon: Write the question or scenario here and on the PPT slide.</li> </ul>	<p><b>Science Content Deepening: Use and Apply</b></p> <p>Insert a use-and-apply question for participants to answer, or a scenario, data set, or phenomenon for them to explain.</p> <p>Use your content background document as needed (resources section of your lesson plans binder).</p>	<p><b>Display Slide 28.</b> Science Content Deepening: Use and Apply (15 min)</p> <p><b>Note:</b> Make sure science-lesson materials are available from the lesson kit.</p> <ol style="list-style-type: none"> <li>Insert on the slide a new use-and-apply question, scenario, data set, or phenomenon for participants to explain. Ensure you have any materials you need if you want participants to observe a phenomenon.</li> <li>Present the question, scenario, data set, or phenomenon described on the slide.</li> <li><b>Individuals:</b> Have participants work quietly on using science ideas to answer the question or explain the scenario, data, or phenomenon. They can use available resources, such as the content background document in the resources section of the lesson plans binder.</li> <li><b>Whole group:</b> Challenge participants to reach an agreement on how to answer the question or explain the scenario, data, or phenomenon without any intervention from you until they've either solved the problem accurately or hit a dead end and can't agree.</li> <li><b>Synthesize/summarize:</b> If participants come up with a strong response for the use-and-apply question or scenario, have one of them provide a summary. If they haven't formulated a strong response, give them a complete explanation as a model.</li> </ol> <p><b>Note:</b> Remind participants not only of the science content but the lesson activities that provide supporting evidence for the ideas. Address any confusion that emerges about the lesson content.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
<p>15 min</p> <p><b>Closing and Reflections</b></p> <p>Slides 27–30</p>	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>To close the session with a discussion of today’s focus questions, practical details, and reflections on today’s learning</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>Video-based lesson analysis supports participants’ learning about the STeLLA framework and strategies, the science content, and about student thinking and learning.</li> <li>Systematic analysis of student responses to open-ended assessment items allows teachers to identify strengths, weaknesses, and patterns in student thinking and learning.</li> <li>Student Thinking Lens (STL) strategy 8—engage students in communicating in scientific ways—involves teaching students about specific scientific practices</li> </ul>	<p><b>Today’s Focus Questions</b></p> <ul style="list-style-type: none"> <li>What can we learn about the STeLLA strategies, science content, and student thinking by analyzing our own classroom videos?</li> <li>How can analysis of students’ pre- and posttests help us identify strengths and weaknesses in student learning and improve our teaching of the lessons?</li> <li>How can we support and challenge students to communicate in scientific ways (STeLLA strategy 8)?</li> </ul> <p><b>Next Study-Group Meeting</b></p> <p>Date:</p> <p>Time:</p> <p>Location:</p> <p>Bring your STeLLA strategies booklet, Summer Institute binder, and lesson plans binder.</p>	<p><b>Display Slide 29.</b> Today’s Focus Questions (5 min)</p> <ol style="list-style-type: none"> <li><b>Individuals:</b> Ask participants to silently think about the focus questions for today’s session.</li> <li><b>Whole group:</b> Invite participants to share their thoughts with the group.</li> </ol> <p><b>Display Slide 30.</b> Next Study-Group Meeting (Less than 1 min)</p> <ol style="list-style-type: none"> <li>Modify the details on the slide.</li> <li>Inform participants of the date, time, and location of the next meeting.</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	they can use in their thinking, acting, talking, and reasoning.	<div style="background-color: #cccccc; height: 15px; margin-bottom: 5px;"></div> <p><b>Reflection Questions</b></p> <ol style="list-style-type: none"> <li>1. Give a specific example of how your participation in the RESPeCT PD program so far has influenced how you think about and teach science?</li> <li>2. What was useful and not so useful about using the features analysis chart in assessing student learning on the pre- and posttests?</li> <li>3. How can communicating in scientific ways support student learning? What challenges might you anticipate when you implement this strategy in your classroom?</li> <li>4. As we move into the second round of study-group sessions focused on content area 2, what are you most looking forward to? What would you like help with?</li> </ol>	<p><b>Display Slide 31.</b> Reflection Questions (9 min)</p> <ol style="list-style-type: none"> <li>a. Direct participants to the reflection sheet and ask them to think about the questions.</li> <li>b. Then have participants write their answers on the reflection sheet.</li> </ol>
		<div style="background-color: #cccccc; height: 15px; margin-bottom: 5px;"></div> <p><b>Thank You!</b></p> <p>Thank you for your participation today!</p>	<p><b>Display Slide 32.</b> Thank You! (Less than 1 min)</p> <ol style="list-style-type: none"> <li>a. Before dismissing participants, thank them for their participation in the study group today.</li> </ol>