

RESPeCT Summer Institute Professional Development Leader Guide (PDLG)

Grade Level	1	Day	6	STeLLA Strategy	SCSL Strategies B, C, and I STL Strategy 7	Subject Matter Focus	Variations in Plants and Animals (VPA)
Focus Questions	<ul style="list-style-type: none"> • How can we begin and end a lesson to help students develop a coherent science content storyline? • How can selecting appropriate science activities help students develop a coherent science content storyline? • How can trait variations affect which plants or animals of the same kind survive long enough to reproduce? 						
Main Learning Goals	<p>Participants will understand the following:</p> <ul style="list-style-type: none"> • STeLLA strategies B, I, and 7 are like bookends that mark the beginning and end of a lesson. The science ideas in the summary should match the focus question from the beginning of the lesson, and both the focus question and the summary should match the lesson's main learning goal. • Activities should be selected because they will help students engage in making sense of the main learning goal, not because they're fun, easy to do, or only topically related. Therefore, activities must be closely matched to the main learning goal. • Trait variations in plants or animals of the same kind affect which individual plants or animals survive and which don't. • Some traits and trait variations in individual plants or animals of the same kind can confer an advantage that enables them to survive long enough to reproduce. 						
Preparation				Materials		Videos	
<p>Daily Setup Tasks</p> <ul style="list-style-type: none"> • Check that video clips are correctly linked to PowerPoint (PPT) slides. • Set up PowerPoint. • Make sure video clips play correctly with good sound. • Arrange furniture and food. • Arrange participant materials. • Put up posters and charts. <p>Planning and Preparation Tasks</p> <ul style="list-style-type: none"> • Study the PDLG, PowerPoint slides (PPTs), video clips, and handouts. Make changes to PPTs if needed. • Review the reflections from day 5 and create a summary slide. • Watch video clips and anticipate participant responses. • Prepare charts for the day's agenda and focus questions. 				<p>Posters and Charts</p> <ul style="list-style-type: none"> • STeLLA Framework and Strategies poster • Day-6 Agenda (chart) • Day-6 Focus Questions (chart) • Norms for Working Together (chart) • Strategy charts from days 1–5 (STL strategies 1–6 and SCSL strategy A) • Parking Lot poster <p>Handouts in RESPeCT PD Binder Front Pocket</p> <ul style="list-style-type: none"> • Participants' SCSL and STL Z-fold summary charts <p>Handouts in RESPeCT PD Binder, Day 6</p> <ul style="list-style-type: none"> • 6.1 Analysis Guides B and I: Setting the Purpose and Summarizing Key Science Ideas • 6.2 Transcript for Video Clips 6.1 • 6.3 Transcript for Video Clips 6.2 • 6.4 Analysis Guide C: Selecting Activities Matched to the Learning Goal • 6.5 Transcript for Video Clip 6.3 		<p>Video clips from one VPA lesson:</p> <ul style="list-style-type: none"> • Video Clip 6.1: Bernstein classroom (strategy B, beginning of lesson); 6.1_mspcp_gr.1.tav_bernstein_L1_c2 • Video Clip 6.2: Bernstein classroom (strategy I, end of lesson); 6.2_mspcp_gr.1.tav_bernstein_L1_c3 <p>Video clips from another VPA lesson:</p> <ul style="list-style-type: none"> • Video Clip 6.3: Bernstein classroom (strategy C, before activity); 6.3_mspcp_gr.1.tav_bernstein_L2_c2 • Video Clip 6.4: Bernstein classroom (strategy C, during activity); 6.4_mspcp_gr.1.tav_bernstein_L2_c3 • Video Clip 6.5: Bernstein classroom (strategy C, after activity); 6.5_mspcp_gr.1.tav_bernstein_L2Lc4 <p>Content deepening:</p> <ul style="list-style-type: none"> • <i>Cottonwood Seed Blowing in the Wind</i> 	

<ul style="list-style-type: none"> • Review the activities for VPA lessons 3a/b and 4a/b in the lesson plans binder. • For content deepening: <ul style="list-style-type: none"> • Check the link for the <i>Cottonwood Seed Blowing in the Wind</i> YouTube video and preview the clip. • Review VPA lesson handout 3.4 and prepare the materials you'll need for the cottonwood-seed model. • Decide which method you want participants to use to mark where their cotton balls land on the butcher paper (see handout 3.4 for details). • Following the protocol on handout 3.4, practice running through the demonstration to make sure you know what to do and how to drop the cotton balls in front of the fan to ensure consistent results. 	<ul style="list-style-type: none"> • 6.6 Transcript for Video Clip 6.4 • 6.7 Transcript for Video Clip 6.5 • 6.8 Daily Reflections—Day 6 <p>Handouts in RESPeCT Lesson Plans Binder</p> <ul style="list-style-type: none"> • 3.4 Protocol for the Cottonwood-Seed Investigation (Teacher Master) (from VPA lesson 3b) <p>PD Leader Masters, Days 5–8</p> <ul style="list-style-type: none"> • PD Leader Master: Analysis Guide C: Selecting Activities Matched to the Learning Goal (Answer Key) <p>Supplies</p> <ul style="list-style-type: none"> • Science notebooks • Chart paper and markers • Lesson materials kit • For content deepening (cottonwood-seed model): <ul style="list-style-type: none"> • Package of full-size cotton balls (5 large cotton balls and 5 small cotton balls per participant) • 12-inch fan • Butcher paper (approximately 6–7 feet or 2–2.5 meters long) • Materials to mark where the cotton balls land on the butcher paper (see lesson handout 3.4) <p>PD Resources</p> <ul style="list-style-type: none"> • STeLLA strategies booklet • RESPeCT PD program binder • RESPeCT lesson plans binder <p>Resources in Lesson Plans Binder</p> <p><i>Resources section:</i></p> <ul style="list-style-type: none"> • Variations in Plants and Animals and Variation in Traits Content Background Document • Common Student Ideas about Variations in Plants and Animals <p><i>Pretabs section:</i></p> <ul style="list-style-type: none"> • Variations in Plants and Animals: Learning Goals for Students and Teachers 	<p>YouTube video (0:31); https://youtu.be/9Cgvjm04EVg</p>
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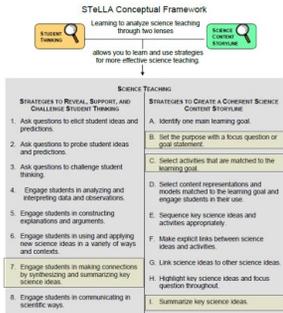
DAY 6 SESSION OUTLINE

Time	Activities	Purpose
8:00–8:30 30 min	Getting Started: Housekeeping, Agenda, Day-5 Reflections, Focus Questions	<ul style="list-style-type: none"> • Build community by sharing participants' reflections from day 5. • Set the stage for a day of learning.
8:30–10:10 100 min (Includes 10-min break)	Lesson Analysis: STeLLA Strategies, B, I, and 7	<ul style="list-style-type: none"> • Use lesson analysis of classroom videos to better understand STeLLA strategies B, I, and 7. • Deepen participants' science-content knowledge of variations in plants and animals through lesson analysis.
10:10–12:00 110 min	Content Deepening: Variations in Plants and Animals	<ul style="list-style-type: none"> • Deepen participants' understandings of variations in plants and animals by engaging in role-plays and evaluating activities in VPA lessons 1 and 2 and the supplemental math lessons. • Deepen participants' science-content knowledge of variations in plants and animals by conducting investigations from VPA lesson 3.
12:00–12:45 45 min	LUNCH	
12:45–1:15 30 min	Content Deepening (Continued)	<ul style="list-style-type: none"> • Deepen participants' science-content knowledge of variations in plants and animals by conducting investigations from VPA lesson 4.
1:15–3:15 120 min (Includes 10-min break)	Lesson Analysis: SCSL Strategy C	<ul style="list-style-type: none"> • Use lesson analysis of classroom videos to better understand SCSL strategy C. • Deepen participants' science-content knowledge of variations in plants and animals through lesson analysis.
3:15–3:30 15 min	Wrap-Up: Summary, Homework, and Reflections	<ul style="list-style-type: none"> • Summarize and reflect on key ideas about STeLLA strategies B, I, 7, and C and the VPA science content.

DAY 6

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
<p>8:00–8:30 30 min</p> <p>Getting Started</p> <p>Slides 1–6</p>	<p>Purpose</p> <ul style="list-style-type: none"> • Build community by sharing participants’ reflections from day 5. • Set the stage for a day of learning. <p>What Participants Do</p> <ul style="list-style-type: none"> • Review the day’s agenda. • Discuss reflections from day 5. • Review key areas of learning from day 5. • Read today’s focus questions. <p>Posters and Charts</p> <ul style="list-style-type: none"> • STeLLA Framework and Strategies poster • Day-6 Agenda (chart) • Day-6 Focus Questions (chart) <p>Supplies</p> <ul style="list-style-type: none"> • Science notebooks 	<div style="border: 1px solid gray; padding: 10px; margin-bottom: 10px;"> <p style="text-align: center;">RESPeCT PD PROGRAM</p> <p style="text-align: center;">Day 6</p> <hr style="width: 50%; margin: auto;"/> <p style="text-align: center; font-size: small;">RESPeCT Summer Institute</p> <div style="display: flex; justify-content: center; gap: 20px;">     </div> </div> <div style="border: 1px solid gray; padding: 10px;"> <p>Agenda for Day 6</p> <ul style="list-style-type: none"> • Day-5 reflections • Review: science content storyline • Today’s focus questions • Lesson analysis: STeLLA strategies B, I, and 7 • Content deepening: variations in plants and animals • Lunch • Content deepening (continued) • Lesson analysis: SCSL strategy C • Summary, homework, and reflections </div>	<p>Display Slide 1. RESPeCT PD Program (5 min)</p> <p>a. Take care of any housekeeping issues.</p> <hr style="border: 0.5px solid gray; margin: 10px 0;"/> <p>Display Slide 2. Agenda for Day 6 (5 min)</p> <p>a. Go over the agenda for the day.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process																		
		<p>Trends in Reflections</p> <table border="1"> <thead> <tr> <th data-bbox="863 315 1073 331">Lesson Analysis</th> <th data-bbox="1073 315 1268 331">Science Content Learning</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> </tbody> </table>	Lesson Analysis	Science Content Learning																	<p>Display Slide 3. Trends in Reflections (7 min)</p> <p>a. Give participants time to review your feedback on their reflections from day 5 and offer reactions, comments, or follow-up questions.</p>
Lesson Analysis	Science Content Learning																				
		<p>Review: Science Content Storyline</p> <p>In your notebooks, jot down ...</p> <ul style="list-style-type: none"> 3 things you remember from yesterday's session, 2 ideas that seem important to you, and 1 question you have. <p>Be prepared to share one idea and question with the group.</p>	<p>Display Slide 4. Review: Science Content Storyline (10 min)</p> <p>a. Point out the three tasks on the slide. Allow 4–5 minutes for participants to write their responses in their science notebooks.</p> <p>b. Have each participant share one idea about the science content storyline that she or he thinks is really important.</p> <p>c. Then ask participants to share their questions. If you can answer them quickly, go ahead and do so. If a question needs a more detailed response, write it down and schedule a time to address it.</p>																		

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		<p style="text-align: center;">Today's Focus Questions</p> <ul style="list-style-type: none"> • How can we begin and end a lesson to help students develop a coherent science content storyline? • How can selecting appropriate science activities help students develop a coherent science content storyline? • How can trait variations affect which plants or animals of the same kind survive long enough to reproduce? 	<p>Display Slide 5. Today's Focus Questions (2 min)</p> <p>a. Introduce today's focus questions.</p>
		<p style="text-align: center;">STeLLA Conceptual Framework</p>  <p>The diagram illustrates the STeLLA Conceptual Framework. At the top, it states 'Learning to analyze science teaching through two lenses' with arrows pointing to 'Science Content Storyline' and 'Student Thinking'. Below this, it says 'allows you to learn and use strategies for more effective science teaching'. The core of the framework is 'SCIENCE TEACHING', which is divided into two columns of strategies:</p> <ul style="list-style-type: none"> STRATEGIES TO REVEAL, SUPPORT, AND CHALLENGE STUDENT THINKING: <ol style="list-style-type: none"> 1. Ask questions to elicit student ideas and predictions. 2. Ask questions to probe student ideas and predictions. 3. Ask questions to challenge student thinking. 4. Engage students in analyzing and interpreting data and observations. 5. Engage students in constructing explanations and arguments. 6. Engage students in using and applying new science ideas in a variety of ways and contexts. 7. Engage students in making connections by synthesizing and summarizing key science ideas. 8. Engage students in communicating in scientific ways. STRATEGIES TO CREATE A COHERENT SCIENCE CONTENT STORYLINE: <ol style="list-style-type: none"> A. Identify one main learning goal. B. Set the purpose with a focus question or goal statement. C. Select activities that are matched to the learning goal. D. Select content representations and models matched to the learning goal and engage students in their use. E. Sequence key science ideas and activities appropriately. F. Make explicit links between science ideas and activities. G. Link science ideas to other science ideas. H. Highlight key science ideas and focus question throughout. I. Summarize key science ideas. 	<p>Display Slide 6. STeLLA Conceptual Framework (1 min)</p> <p>a. “Today we’ll be looking at four new STeLLA strategies. Three of them are Science Content Storyline Lens strategies, and one is a Student Thinking Lens strategy. Throughout the session, think about how these strategies are different from one another and how they are closely linked to each other.”</p>

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<p>8:30–10:10 100 min (Includes 10-min break)</p> <p>Lesson Analysis: STeLLA Strategies B, I, and 7</p> <p>Slides 7–14</p>	<p>Purpose</p> <ul style="list-style-type: none"> Use lesson analysis of classroom videos to better understand STeLLA strategies B, I, and 7. Deepen participants’ science-content knowledge of variations in plants and animals through lesson analysis. <p>Content</p> <ul style="list-style-type: none"> Strategies B, I, and 7 are like bookends that mark the beginning and end of a lesson. The science ideas used in the summary should match the focus question from the beginning of the lesson, and both the focus question and the summary should match the lesson’s main learning goal. Variations in Plants and Animals science content emerges from video-based lesson analysis. <p>What Participants Do</p> <ul style="list-style-type: none"> Make, share, and discuss charts summarizing the purposes and key features of strategies B, I, and 7. Discuss questions about strategies B, I, and 7. Analyze video clips from the beginning and end of a VPA lesson. Study the main learning goal (MLG), focus question, and summary in a VPA lesson plan. 	<p>Lesson Analysis: Focus Question 1</p> <p>How can we begin and end a lesson to help students develop a coherent science content storyline?</p> <hr/> <p>Strategies B, I, and 7: Purposes and Key Features</p> <p>Group 1: What are the purpose and key features of strategy B? <ul style="list-style-type: none"> Why is a focus question or goal statement important for science content storyline coherence? </p> <p>Group 2: What are the purpose and key features of strategy I? <ul style="list-style-type: none"> Why is summarizing key science ideas important for science content storyline coherence? </p> <p>Group 3: What are the purpose and key features of strategy 7? <ul style="list-style-type: none"> How does strategy 7 compare with strategy I? </p> <p>All groups: Make sure to cite ideas from the STeLLA strategies booklet in your answers.</p>	<p>Display Slide 7. Lesson Analysis: Focus Question 1 (Less than 1 min)</p> <p>a. “Now let’s dig into our first focus question.”</p> <hr/> <p>Display Slide 8. Strategies B, I, and 7: Purposes and Key Features (25 min)</p> <p>a. Pairs (3 min): Direct participants to retrieve their Z-fold summary charts and share with a partner what they learned from their homework assignment about STeLLA strategies B, I, and 7.</p> <p>b. Small groups (12 min): Divide participants into three small groups and have them make charts that capture the purposes and key features of the three strategies.</p> <p>Note: Challenge participants to imagine themselves in a Teacher Leader role. Ask them, “How would you explain these strategies to the teachers you’re leading?”</p> <p>c. Whole group (10 min): Have small groups share their charts in a whole-group share-out.</p> <p>Key ideas:</p> <ul style="list-style-type: none"> Make sure participants understand that a focus question is designed to do more than just get students interested in the lesson. It gets them thinking about a phenomenon or something

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	<p>Videos</p> <ul style="list-style-type: none"> • Video Clip 6.1, Bernstein classroom (beginning of lesson) • Video Clip 6.2, Bernstein classroom (end of lesson) <p>Handouts in PD Binder</p> <ul style="list-style-type: none"> • 6.1 Analysis Guides B and I • 6.2 Transcript for Video Clip 6.1 • 6.3 Transcript for Video Clip 6.2 <p>Supplies</p> <ul style="list-style-type: none"> • Science notebooks • Chart paper and markers <p>PD Resources</p> <ul style="list-style-type: none"> • STeLLA strategies booklet • RESPeCT lesson plans binder • Participants' SCSL and STL Z-fold summary charts (front pocket of PD binder) 	<div style="background-color: #cccccc; height: 15px; margin-bottom: 5px;"></div> <p>Discussion Questions: Strategy B</p> <ol style="list-style-type: none"> 1. What is the difference between focus questions and goal statements? 2. Which do you think would be more useful in engaging student interest and making their thinking visible—focus questions or goal statements? 	<p>else they've never thought about before. It also reveals important things about the knowledge and experiences they're bringing to the lesson, it conceptually situates the learning, and it's referred to throughout the lesson.</p> <ul style="list-style-type: none"> • STeLLA strategies B, I, and 7 are like bookends that mark the beginning and end of a lesson. The science ideas used in the summary should match the focus question from the beginning of the lesson, and both the focus question and the summary should match the lesson's main learning goal. <hr/> <p>Display Slide 9. Discussion Questions: Strategy B (7 min)</p> <p>a. Whole group: Discuss the questions on the slide as a group.</p> <p>Key ideas:</p> <ul style="list-style-type: none"> • A focus question is designed to be answered using the lesson's main learning goal and supporting science ideas. A goal statement describes the main science idea to be learned. • Focus questions are always used in RESPeCT lesson plans because they're useful in engaging student interest, making their thinking visible, and eliciting initial ideas at the beginning of a lesson. When posed at the end of a lesson, focus questions challenge students to use new ideas developed during the lesson.

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		<p style="background-color: #d3d3d3; padding: 2px;">Discussion Questions: Strategies I and 7</p> <ol style="list-style-type: none"> 1. What are various ways a lesson or unit can be synthesized and/or summarized? 2. How are strategies I and 7 similar and different? <ol style="list-style-type: none"> a. SCSL strategy I: Summarize key science ideas. b. STL strategy 7: Engage students in making connections by synthesizing and summarizing key science ideas. 	<p>Display Slide 10. Discussion Questions: Strategies I and 7 (7 min)</p> <ol style="list-style-type: none"> a. Whole group: Discuss the first question on the slide. Participants can refer to the information on strategy 7 in the STeLLA strategies booklet to identify a variety of ways in which key science ideas in a lesson can be synthesized. b. Emphasize: “Toward the end of a unit, an entire lesson may be devoted to strategy 7, which engages students in synthesizing and summarizing science ideas across several lessons.” c. Discuss the second question on the slide. <p>Key ideas:</p> <ul style="list-style-type: none"> • In strategy I, the <i>teacher</i> creates a summary of key science ideas in the lesson. Strategy 7, however, engages <i>students</i> in synthesizing and summarizing key science ideas in the lesson. When <i>students themselves</i> perform this work, it makes their thinking visible, engages them in active sensemaking, and reveals to the teacher any misunderstandings or gaps in knowledge. Using both strategies brings coherence to a science lesson and is a powerful way to end it. • In strategy 7, summarizing involves making connections between key science ideas, which helps students <i>synthesize</i> the main learning goal or big idea in a lesson. • Summaries should focus on key science ideas, not activities; that is, focusing on “what we <i>learned</i>” versus “what we <i>did</i>.” • For a variety of reasons, a lesson sometimes ends before the main learning goal has been fully developed. However, summarizing work should still take place. For example, the

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			<p>teacher might say, “Our focus question today was <i>How do plants get their food?</i> What have we found out so far?” After students respond, the teacher could reply, “Yes, so far we’ve discovered that water and soil aren’t food for plants. But we still haven’t figured out what <i>is</i> food for plants. We’ll continue working on this question next time.”</p>
		<p>Video-based Lesson Analysis</p> <p>Next we’ll analyze a video clip from the beginning and end of a lesson on variations in plants and animals.</p>	<p>Display Slide 11. Video-based Lesson Analysis (Less than 1 min)</p> <p>a. Transition: This slide marks the transition to video-based lesson analysis.</p>
		<p>Lesson Analysis: Strategy B</p> <ol style="list-style-type: none"> In Analysis Guides B and I (handout 6.1), review the four criteria for strategy B: Setting the purpose. Read the lesson context at the top of the video transcript (handout 6.2). Watch the video clip, keeping in mind the criteria for strategy B. Analyze the transcript using the analysis guide. <ul style="list-style-type: none"> <i>How well does the beginning of this lesson match the criteria for strategy B?</i> Share and compare your analyses. <p><small>Link to video clip 1: 6.1_mscpcp_gr.1tav_bernstein_l1_c2</small></p>	<p>Display Slide 12. Lesson Analysis: Strategy B (20 min)</p> <p>a. Have participants locate Analysis Guides B and I (handout 6.1 in PD program binder) and spend 1 or 2 minutes reading the criteria for strategy B: Setting the purpose.</p> <p>b. Ask: “Do you have any questions about these criteria?”</p> <p>c. Emphasize: “Keep the criteria for strategy B in mind as you watch a video clip from the beginning of a lesson about variations in plants and animals.”</p> <p>d. Individuals: Give participants a couple of</p>

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			<p>minutes to read and think about the lesson context at the top of the video transcript (handout 6.2).</p> <p>e. Whole group: “How well does the beginning of this lesson match the criteria for strategy B?”</p> <p>Note: During the discussion, be on the lookout for opportunities to clarify science-content ideas.</p> <p>Ideal responses for questions from Analysis Guide B:</p> <ul style="list-style-type: none"> • Implied main learning goal? At video segment 0:01:02, the teacher introduces the unit central question: “<i>How do differences ... in plants and animals of the same kind help them to survive?</i>” and at segment 0:02:18, the teacher introduces the lesson focus question, “<i>How are birds alike and different?</i>” The implied main learning goal is that animals (birds) of the same group are similar but not exactly the same. • Uses everyday language? Yes. The focus question uses everyday language (How are birds alike and different?) • Scientifically accurate? The focus question is presented in a scientifically accurate way that’s age appropriate for students. • Goal statement? Not applicable.

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		<p style="background-color: #e0e0e0; padding: 2px;">Lesson Analysis: Strategy I</p> <ol style="list-style-type: none"> 1. In Analysis Guides B and I (handout 6.1), review the six criteria for strategy I: Summarizing key science ideas. 2. Review the lesson context at the top of the video transcript (handout 6.3). 3. Watch the video clip, keeping in mind the criteria for strategy I. 4. Analyze the transcript using the analysis guide. <ul style="list-style-type: none"> • <i>How well does the end of this lesson match the criteria for strategy I?</i> 5. Share and compare your analyses. <p style="text-align: center; font-size: small;">Link to video clip 2: 6.2_mspcp_gr1.tav_bernstein_L1_c3</p>	<p>Display Slide 13. Lesson Analysis: Strategy I (20 min)</p> <ol style="list-style-type: none"> a. Allow participants 1 or 2 minutes to read the six criteria in the analysis guide for strategy I: Summarizing key science ideas. b. Ask: “Do you have any questions about these criteria?” c. Emphasize: “Keep the criteria for strategy I in mind as you watch the next clip from the end of the same VPA lesson.” d. Individuals: Give participants a couple of minutes to read and think about the lesson context at the top of the video transcript (handout 6.3). e. Show the video clip. f. Whole group: “How well does the end of this lesson match the criteria for strategy I? How well does the summary statement match the beginning of the lesson?” <p>Note: During the discussion, be on the lookout for opportunities to clarify science-content ideas.</p> <p>Ideal responses for questions from Analysis Guide I:</p> <ul style="list-style-type: none"> • Summary statement/activity? Yes, the teachers engages students in a summarizing activity by asking them to select one trait of an animal (bird) or plant and draw a variation or difference they observed. • Conceptual understanding? The summary activity focuses on the big idea that plants or animals of the same kind have traits that can vary. The teacher will be able to evaluate how

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			<p>well students understand the concepts by reviewing their drawings.</p> <ul style="list-style-type: none"> • Matched to the MLG and FQ? The science idea in the summary activity is matched to the focus question. • Scientifically accurate? The summary activity is presented in a scientifically accurate way that's age appropriate for students. • Sensemaking? Students are in the process of selecting the trait they wish to focus on. It's unclear whether they're engaged in sensemaking because the video stops before we can see what happens. • Improvements? The summary activity could be improved by getting more students involved. Before students draw the trait variations they selected, the teacher could ask one or two students to come to the front of the class, point to the traits they selected and describe the differences or variations in those traits.
		<p>The VPA Lesson Plans: Reading and Analysis</p> <ol style="list-style-type: none"> 1. Examine the main learning goal, the lesson focus question, and the lesson summary for your assigned VPA lesson plan (parts A and B). 2. Answer these questions in your notebooks, keeping in mind the analysis-guide criteria for strategies B and I: <ul style="list-style-type: none"> • What do you notice? • What do you wonder about? 	<p>Display Slide 14. The VPA Lesson Plans: Reading and Analysis (10 min)</p> <p>Note: This slide can be abridged or skipped if time is running short.</p> <ol style="list-style-type: none"> a. Read the instructions on the slide and assign a two-part lesson plan (parts A and B) to each participant. <p>Note: Some of the VPA lessons have more than two parts (lessons 1 and 5), so you'll need to decide how you want to divide them up among participants.</p> b. Ask participants if they have any questions about the assignment. c. Individual reading-and-analysis time

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			<p>(5 min): “Answer the slide questions in your notebooks, keeping in mind the analysis-guide criteria.”</p> <p>d. Whole-group discussion (5 min): Briefly discuss participants’ observations and questions for their assigned lesson plans.</p> <p>Note: Participants should see a close match between the main learning goal, the lesson focus question, and the summary. However, also welcome critiques and suggestions for improvement. Just make sure critiques are based on good understandings of the strategies involved.</p>
10:00–10:10 10 min	BREAK		
10:10–12:00 110 min Content Deepening: Variations in Plants and Animals Slides 15–34	<p>Purpose</p> <ul style="list-style-type: none"> • Deepen participant’s understandings of variations in plants and animals by engaging in role-plays and evaluating activities in VPA lessons 1, 2, and the supplemental math lessons. • Deepen participants’ science-content knowledge of variations in plants and animals by conducting investigations from VPA lesson 3. <p>Content</p> <ul style="list-style-type: none"> • Trait variations in plants or animals of the same kind affect 	 <p>The slide features a title 'VARIATIONS IN PLANTS AND ANIMALS' in red and orange text. Below the title, it says 'SCIENCE CONTENT DEEPENING' and 'Grade 1'. There are four logos at the bottom: a sun-like logo, a blue circular logo, a green logo, and the BSCS logo.</p>	<p>Display Slide 15. Content Deepening: Variations in Plants and Animals (Less than 1 min)</p> <p>a. Transition: This slide marks the transition to the content deepening work on variations in plants and animals.</p> <p>Note: Throughout this content deepening phase, refer as needed to the content background document and Common Student Ideas about Variations in Plants and Animals.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	<p>which individual plants or animals survive and which don't.</p> <ul style="list-style-type: none"> Some traits and trait variations in individual plants or animals of the same kind can confer an advantage that enables them to survive long enough to reproduce. <p>What Participants Do</p> <ul style="list-style-type: none"> Review key science ideas about traits and variations from the previous content deepening session. Engage in teaching role-plays for lessons 1 and 2 in the VPA unit. Review Common Core math standards for measurement and data. Evaluate the measuring activity in the supplemental math lessons. Summarize key ideas about trait variation from the content background document. Use a model to show how far big and small cottonwood seeds travel on the wind. Use data from the model to explain which seeds are more likely to survive and grow into new cottonwood trees. <p>Handouts in Lesson Plans Binder</p> <ul style="list-style-type: none"> 3.4 Protocol for the Cottonwood-Seed Investigation (Teacher Master) 	<p>Unit Central Question</p> <p>How do differences (variations) in plants or animals of the same kind help them survive so they can produce young (babies or seeds)?</p>  <p>Review</p> <p>Focus questions from our last session:</p> <ul style="list-style-type: none"> How do traits of living things help us understand how they're grouped and related? Why are trait variations important for the survival of living things? How can we represent patterns of trait variation among individuals of a species? 	<p>Display Slide 16. Unit Central Question (Less than 1 min)</p> <p>a. Review the unit central question on the slide.</p> <p>Display Slide 17. Review (2 min)</p> <p>a. Review the focus questions on the slide from the previous content deepening session.</p> <p>b. "First, let's review the key science ideas from our last session that answer these questions."</p> <p>c. Elicit key ideas from the previous session that helped participants answer these questions.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	<p>Supplies</p> <ul style="list-style-type: none"> • Science notebooks • Chart paper and markers • Lesson materials kit • Cottonwood-seed model (see overview page) <p>PD Resources</p> <ul style="list-style-type: none"> • STeLLA strategies booklet • RESPeCT lesson plans binder <p>Resources in Lesson Plans Binder</p> <p><i>Resources section:</i></p> <ul style="list-style-type: none"> • Content background document • Common Student Ideas 	<p> Key Science Ideas</p> <ul style="list-style-type: none"> • Plants or animals of the same group share similar characteristics or traits that we can recognize. • Plants or animals of the same group also have variations in traits that can help them survive. • Some traits in plants or animals of the same kind can be measured, and we can use these measurements to confirm how much variation exists in a trait. • Patterns of trait variation among individuals of a species can be represented in different ways, such as on frequency distribution tables and histograms. <hr/> <p>Role-Play: VPA Lesson 1</p> <ol style="list-style-type: none"> 1. Pair up and decide who will be Teacher 1 and Teacher 2 for this role-play. 2. Teacher 1: Review lessons 1a and 1d, select a 7-minute segment from one lesson to teach, and gather the necessary materials listed on the overview page. 3. Teacher 2: Review lessons 1b and 1c, select a 7-minute segment from one lesson to teach, and gather the necessary materials. 4. If you aren't the one teaching, you'll be the student. 	<p>Display Slide 18. Key Science Ideas (Less than 1 min)</p> <p>a. Review the key science ideas on the slide.</p> <hr/> <p>Display Slide 19. Role-Play: VPA Lesson 1 (8 min)</p> <p>Note: To allow more time for the investigations from VPA lessons 3 and 4, you may want to scale back the role-plays for lessons 1 and 2 or omit one of them.</p> <p>a. Orient participants to the role-play and walk them through the instructions on the slide. You may also want to go over how the lesson plans are organized (overview page, general outline, and main lesson plan) and what each section contains.</p> <p>b. Emphasize that the lesson plans are meant to be used only as a <i>guide</i> to help teachers prepare for a lesson, not as a script to follow. These idealized plans demonstrate how the lessons <i>might</i> be implemented using embedded STeLLA strategies.</p> <p>c. Share any important lessons you may have learned from teaching these lessons.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p>Role-Play: VPA Lesson 1</p> <ol style="list-style-type: none"> Prepare for the role-play: <ul style="list-style-type: none"> Student role: Review the Common Student Ideas document (resources section of binder) and be ready to use these ideas when you're the student. Teacher role: Review the anticipated student responses and practice asking each other elicit and probe questions. Act out the role-play with your partner; then switch roles. 	<p>Display Slide 20. Role-Play: VPA Lesson 1 (15 min)</p> <ol style="list-style-type: none"> Read through the instructions on the slide and answer any questions about the role-play. Have participants pair up and complete the tasks on the slide. Make sure to give pairs adequate time to prepare for and act out their role-plays.
		<p>Review: VPA Lesson 1</p> <ol style="list-style-type: none"> In what ways did the activity in each lesson (1a–d) align with the corresponding focus question(s)? How well matched were the activity and main learning goal in each lesson? What strategies are used to help students summarize the key ideas in each lesson? How well does the content in each lesson align with the content deepening work from last time? What level of life (biology) varied in each lesson? 	<p>Display Slide 21. Review: VPA Lesson 1 (8 min)</p> <ol style="list-style-type: none"> Read the questions on the slide. Have participants split up into small groups; then assign one question to each small group. Small groups: Direct groups to discuss their assigned question, develop an answer, and record their answers and ideas in their science notebooks. Note: Encourage participants to refer to the purposes and key features of SCSL strategies A, B, and C in their strategies booklets that are highlighted in the first three questions. Whole-group share-out: Invite groups to share their ideas for answering their assigned question. Highlight the level-of-life variations across different species explored in lessons 1a–d.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p>Role-Play: VPA Lesson 2</p> <ol style="list-style-type: none"> 1. Pair up and decide who will be Teacher 1 and Teacher 2 for this role-play. The person not teaching will be the student. 2. Teacher 1: Review lesson 2a select a 10-minute segment to teach, and gather the materials. 3. Teacher 2: Review lesson 2b, select a 10-minute segment to teach, and gather the materials. 4. Students: Come up with 3 challenge questions the teacher might ask to move your thinking forward. 5. Practice asking each other elicit, probe, and challenge questions. 6. Act out the role-play; then switch roles. 	<p>Display Slide 22. Role-Play: VPA Lesson 2 (20 min)</p> <ol style="list-style-type: none"> a. “In VPA lesson 2, students will explore trait variations within a species.” b. Walk participants through the instructions on the slide. c. “If you’re the student in the role-play, look through the lesson and come up with three challenge questions the teacher might ask to move your thinking forward. It’s often difficult to come up with challenge questions spontaneously, so your job as a student is to think of challenge questions that relate to ideas you’d expect your students to struggle with. Make sure to share these questions with your partner before you begin the role-play.” d. Share any important lessons you may have learned from teaching the lesson. e. Have participants pair up and complete the tasks on the slide. f. Make sure to give pairs adequate time to prepare for and act out their role-plays.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p>Review: VPA Lesson 2</p> <ol style="list-style-type: none"> 1. In what ways did the activity in each lesson (2a and 2b) align with the corresponding focus question(s)? 2. How well matched were the activity and main learning goal in each lesson? 3. What strategies are used to help students summarize the key ideas in each lesson? 4. How well does the content in each lesson align with the content deepening work from last time? 	<p>Display Slide 23. Review: VPA Lesson 2 (7 min)</p> <ol style="list-style-type: none"> a. Read the questions on the slide. b. Have participants split up into small groups; then assign one question to each small group. c. Small groups: Direct groups to discuss their assigned question, develop an answer, and record their answers and ideas in their science notebooks. <p>Note: Encourage participants to refer to the purposes and key features of SCSL strategies A, B, and C in their strategies booklets that are highlighted in the first three questions.</p> <ol style="list-style-type: none"> d. Whole-group share-out: Invite groups to share their ideas for answering their assigned question.
		<p>Common Core Math Standards</p> <ul style="list-style-type: none"> • Order three objects by length; compare the lengths of two objects indirectly by using a third object (1.MD.A.1) • Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. <i>Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.</i> (1.MD.A.2) • Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1.MD.C.4) 	<p>Display Slide 24. Common Core Math Standards (1 min)</p> <ol style="list-style-type: none"> a. Read the 1st-grade Common Core math standards for measurement and data on the slide. b. Note that these standards will be addressed in the supplemental math lessons in the VPA unit.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p style="text-align: center;">Math Connections!</p> <p>Read through supplemental math lessons 1 and 2 in your lesson plans binder. Then answer these questions in your science notebooks:</p> <ul style="list-style-type: none"> • What activity do students engage in? • What materials are needed for this activity? • How well does the activity fit the unit central question? • How is the activity relevant to the math concepts your 1st graders learn about? 	<p>Display Slide 25. Math connections! (8 min)</p> <p>a. Introduce the task and questions on the slide.</p> <p>b. Individuals: Have participants answer the questions in their science notebooks.</p> <p>c. Whole group: Invite participants to share their answers to the questions.</p> <p>d. Ask participants, “How could you emphasize the math concepts outside the science lessons?”</p>
		<p style="text-align: center;">Let’s Summarize!</p> <ul style="list-style-type: none"> • Read section 3 (Variation in Traits) in the content background document. • Write a sentence in your notebook summarizing key ideas from the reading. • Be prepared to share your summary statement with the group. 	<p>Display Slide 26. Let’s Summarize! (4 min)</p> <p>a. Individuals: Have participants read section 3 (Variation in Traits) in the content background document and then write a sentence in their notebooks summarizing key ideas from the reading.</p> <p>b. Whole group: Invite a few participants to share their summary statements with the group.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p>Content Deepening Focus Question</p> <p>How can trait variations affect which plants or animals of the same kind survive long enough to reproduce?</p>	<p>Display Slide 27. Content Deepening Focus Question (1 min)</p> <p>a. “Next, we’ll investigate ideas about trait variations from VPA lesson 3. The evidence we gather will help us answer our content deepening focus question, <i>How can trait variations affect which plants or animals of the same kind survive long enough to reproduce?</i>”</p> <p>b. Ask participants to write the question in their science notebooks.</p>
		<p>Lesson-3 Focus Questions</p> <p>Will bigger or smaller cottonwood-tree seeds be more likely to survive and grow when the wind carries them away? Why do you think so?</p>	<p>Display Slide 28. Lesson-3 Focus Questions (1 min)</p> <p>a. Introduce the focus questions from VPA lesson 3 on the slide.</p> <p>b. Ask participants how these questions relate to the content deepening focus question, <i>How can trait variations affect which plants or animals of the same kind survive long enough to reproduce?</i></p> <p>c. Note that a more specific focus question was chosen for students because it’s likely to be more engaging and easier for them to answer.</p>

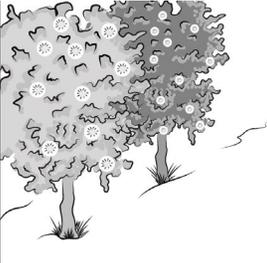
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="863 297 1142 321">What Is a Cottonwood Tree?</p>  <p data-bbox="911 570 1045 578"><small>Photograph by Amy Garenna/Wikimedia Commons</small></p> <p data-bbox="1108 542 1268 550"><small>Photograph by George Chernilevsky/Wikimedia Commons</small></p>	<p data-bbox="1325 261 1896 318">Display Slide 29. What Is a Cottonwood Tree? (5 min)</p> <p data-bbox="1325 370 1877 427">Note: Some of the following content was taken from VPA lesson 3a.</p> <ol data-bbox="1325 467 1913 1425" style="list-style-type: none"> <li data-bbox="1325 467 1860 553">“The tree on this slide is a cottonwood tree. Why do you think it’s called a <i>cottonwood tree</i>?” <li data-bbox="1325 573 1871 630">“Who can describe what this tree looks like? What are some of its traits?” <li data-bbox="1325 649 1887 706">As participants share their ideas, record them on chart paper. <li data-bbox="1325 725 1887 782">“Now look carefully at the fluffy, white stuff on the leaves. What do you think it is?” <li data-bbox="1325 802 1913 1198">After participants share their ideas, explain that the white stuff isn’t cotton but is actually where the seeds are located. Note that cottonwood seeds are attached to structures that resemble tufts of cotton. These tufts, which are actually the fruit of the tree, allow the seeds to travel long distances on wind currents before landing on the ground. In other words, the fruit contains or holds the seeds in cottonwood trees and dandelions. This entire structure is called a <i>seed</i> because it’s easier for 1st graders to understand, even though the term isn’t technically correct. <li data-bbox="1325 1218 1860 1304">“Next, let’s list some traits and variations of cottonwood-tree seeds. What are some possible traits?” <li data-bbox="1325 1323 1887 1380">As participants share their ideas, record them on chart paper. <li data-bbox="1325 1399 1835 1425">“Now let’s list some possible variations in

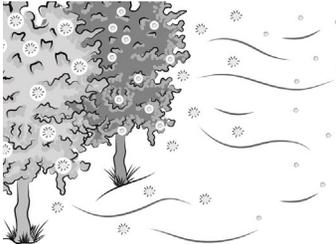
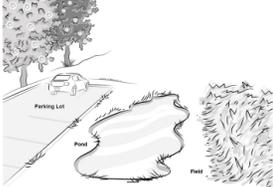
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="869 849 1262 873">Cottonwood Seeds Blowing in the Wind</p> <p data-bbox="869 891 1247 935">Let's watch a short video clip of cottonwood-tree seeds blowing in the wind.</p>  <p data-bbox="1035 1105 1266 1141"><small>Photograph by George Demetriou/Wikimedia Commons</small> Link to video clip: https://youtu.be/9Cjvjm04EVg</p>	<p data-bbox="1352 245 1640 269">cottonwood-seed traits.”</p> <p data-bbox="1325 290 1845 315">i. Record participants' ideas on chart paper.</p> <p data-bbox="1325 354 1745 378">Possible cottonwood-seed traits:</p> <ul data-bbox="1325 386 1864 532" style="list-style-type: none"> • Seeds are made of a cotton-like material. • Seeds are white. • Seeds are fluffy. • Seeds are attached to a “ball” of cotton-like material. <p data-bbox="1325 570 1803 594">Possible cottonwood-seed variations:</p> <ul data-bbox="1325 602 1906 686" style="list-style-type: none"> • Seed shape • Seed weight • Seed size (including the ball of cotton material) <p data-bbox="1325 816 1913 873">Display Slide 30. Cottonwood Seeds Blowing in the Wind (1 min)</p> <p data-bbox="1325 927 1871 984">a. Show the YouTube video clip of cottonwood seeds blowing in the wind.</p> <p data-bbox="1325 1003 1887 1060">b. Following the clip, invite participants to briefly share their comments and observations.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="877 297 1125 321">Cottonwood-Seed Model</p> <ul data-bbox="877 342 1100 581" style="list-style-type: none"> • What does the fan represent? • What do the cotton balls represent? • What does the paper on the floor represent? • What does the line on the paper marked "Tree" represent? 	<p data-bbox="1325 258 1850 318">Display Slide 31. Cottonwood-Seed Model (7 min)</p> <ol data-bbox="1325 370 1913 1101" style="list-style-type: none"> a. Have participants locate VPA handout 3.4 in their lesson plans binders and read through the protocol for the cottonwood-seed investigation. b. While participants are reading, set up the cottonwood-seed model based on the instructions in the handout. c. Ask participants what different parts of the model represent in the natural world. <ul data-bbox="1373 662 1898 899" style="list-style-type: none"> • Fan = wind blowing the cottonwood seeds • Large cotton balls = large cottonwood seeds • Small cotton balls = small cottonwood seeds • Butcher paper on the floor = the ground • Line on the paper marked "Tree" = where the tree is standing d. Run through the demonstration for participants so they understand how to drop the cotton balls in front of the fan. Also explain and demonstrate the method you want them to use to mark where the cotton balls land on the paper.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="869 297 1199 321">What Do You Think Will Happen?</p> <p data-bbox="869 342 1236 412">Will the bigger or smaller cotton balls (cottonwood seeds) travel farther when the wind blows them? Why do you think so?</p> <p data-bbox="869 433 1255 477">Write your predictions in your notebook using this sentence starter:</p> <p data-bbox="905 488 1230 558"><i>I predict the [bigger or smaller] cotton balls will travel farther on the wind because ...</i></p>	<p data-bbox="1325 258 1839 318">Display Slide 32. What Do You Think Will Happen? (2 min)</p> <ol data-bbox="1325 370 1913 610" style="list-style-type: none"> Read the question on the slide. Individuals: Ask participants to write their predictions in their science notebooks using the sentence starter. Whole group: Invite two participants with different predictions to share them with the group and include their reasoning.
		<p data-bbox="869 708 1205 732">How Far Will the Cotton Balls Fly?</p>  <p data-bbox="1079 980 1146 992"><small>Photo courtesy of BCS</small></p>	<p data-bbox="1325 670 1902 730">Display Slide 33. How Far Will the Cotton Balls Fly? (15 min)</p> <ol data-bbox="1325 782 1913 1401" style="list-style-type: none"> Before starting the investigation, review how participants should drop their cotton balls in front of the fan to ensure consistent results. Give each participant five large cotton balls and five small cotton balls to drop in front of the fan. Then walk participants through the investigation, following the steps on handout 3.4. Have the first participant drop each cotton ball in front of the fan one at a time and then mark where it lands on the butcher paper using the method you demonstrated earlier. Participants should drop one large cotton ball in front of the fan and mark where it lands and then drop a small cotton ball and mark where it lands, and then repeat the same steps for the remaining cotton balls. Have other participants continue this procedure one at a time until everyone has dropped their

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="871 980 1205 1003">Reflect: Lesson-3 Focus Questions</p> <p data-bbox="871 1019 1255 1105">Lesson-3 focus questions: <i>Will bigger or smaller cottonwood-tree seeds be more likely to survive and grow after the wind carries them away? Why do you think so?</i></p> <ul data-bbox="890 1127 1255 1192" style="list-style-type: none"> • Think about the results of our investigation. Then complete this sentence in your science notebook: <p data-bbox="907 1203 1262 1268"><i>I think [bigger or smaller] cottonwood-tree seeds are more likely to survive and grow into new cottonwood trees because ...</i></p>	<p data-bbox="1352 245 1864 267">cotton balls and marked where they landed.</p> <p data-bbox="1325 293 1856 347">e. After the activity, display the butcher paper where everyone can see the results.</p> <p data-bbox="1352 370 1885 516">Note: The end of the paper closest to the fan should be labeled “Tree” so participants can easily see which cotton balls or seeds landed closer to the parent tree and which landed farther away.</p> <p data-bbox="1325 539 1881 651">f. Ask participants to examine where the large and small cotton balls (or cottonwood seeds) landed and describe any patterns they observe.</p> <p data-bbox="1352 673 1906 911">Note: Participants should observe that the smaller cotton balls traveled farther from the fan than the larger cotton balls. These results reflect what happens when the wind blows large and small cottonwood seeds away from the parent tree. The larger seeds typically land closest to the tree, and the smaller seeds travel farther away from the tree.</p> <hr/> <p data-bbox="1325 951 1843 1008">Display Slide 34. Reflect: Lesson-3 Focus Questions (5 min)</p> <p data-bbox="1325 1062 1881 1115">a. Review the focus questions for VPA lesson 3 on the slide.</p> <p data-bbox="1325 1138 1906 1284">b. Individuals: Ask participants to think about the results of the cottonwood-seed investigation and then answer the questions in their notebooks using the sentence starter on the slide.</p> <p data-bbox="1325 1307 1864 1391">c. Whole group: Invite a few participants to share their responses with the group. Make sure they include evidence from the</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			investigation to support their ideas.
12:00–12:45 45 min	LUNCH		
12:45–1:15 30 min Content Deepening (Continued) Slides 35–40	<p>Purpose</p> <ul style="list-style-type: none"> • Deepen participants’ science-content knowledge of variations in plants and animals by conducting investigations from VPA lesson 4. <p>Content</p> <ul style="list-style-type: none"> • Trait variations in plants or animals of the same kind affect which individual plants or animals survive and which don’t. • Some traits and trait variations in individual plants or animals of the same kind can confer an advantage that enables them to survive long enough to reproduce. <p>What Participants Do</p> <ul style="list-style-type: none"> • Listen to a story about two cottonwood trees and their seeds. • Predict where the big and small cottonwood seeds will land and which seeds will land in an environment where they can survive and grow into new cottonwood trees. • Review the prediction strategy used in lesson 4a. • Explain how trait variations affect 	<p style="text-align: center;">Lesson-4 Focus Question</p> <p>What helps some cottonwood-tree seeds survive and grow while other seeds don’t?</p> <hr/> <p style="text-align: center;">A Story about Two Cottonwood Trees</p> 	<p>Display Slide 35. Lesson-4 Focus Question (Less than 1 min)</p> <ol style="list-style-type: none"> Introduce the focus question from VPA lesson 4 on the slide. “To help us answer this question, we’ll explore how trait variations determine which cottonwood seeds survive and which don’t.” <hr/> <p>Display Slide 36. A Story about Two Cottonwood Trees (2 min)</p> <ol style="list-style-type: none"> “Listen to this story about two cottonwood trees and their seeds.” “Two cottonwood trees live side by side at the edge of a forest. It’s late in the summer, and the trees have produced a lot of seeds that hang from their branches. One cottonwood tree produces small seeds, and the other cottonwood tree produces big seeds. All the seeds need is a strong gust of wind to come along and carry them away.” Explain that wind is stronger than the air from a fan, so real cottonwood-tree seeds would travel farther than the cotton balls did in the cottonwood-seed model.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	<p>which plants or animals of the same kind survive long enough to reproduce.</p> <p>Supplies</p> <ul style="list-style-type: none"> • Science notebooks • Chart paper and markers <p>PD Resources</p> <ul style="list-style-type: none"> • RESPeCT lesson plans binder <p>Resources in Lesson Plans Binder</p> <p><i>Pretabs section:</i></p> <ul style="list-style-type: none"> • Variations in Plants and Animals: Learning Goals for Students and Teachers 	<div data-bbox="835 253 1297 646"> <p>The Wind Starts to Blow!</p>  </div> <div data-bbox="835 662 1297 1393"> <p>Where Will the Cottonwood Seeds Land?</p>  <p>Which of the cottonwood-tree seeds will land in a place where they can survive and grow into new cottonwood trees? Why?</p> </div>	<p>Display Slide 37. The Wind Starts to Blow! (Less than 1 min)</p> <p>a. “All of a sudden, the wind starts to blow, and the seeds take off! Where are they headed? How far will they fly?”</p> <hr/> <p>Display Slide 38. Where Will the Cottonwood Seeds Land? (12 min)</p> <p>a. “Not far from the edge of the forest are three very different environments: a parking lot, a pond, and an open field. The parking lot is closest to the edge of the forest, the pond is a little farther away, and the open field is just beyond the pond. Which of the cottonwood-tree seeds will land in a place where they can survive and grow into new cottonwood trees?”</p> <p>b. After finishing the story. Have participants write the questions on the slide in their science notebooks.</p> <p>c. Pairs: Ask participants to pair up with an elbow partner and discuss the questions. Then have them record their ideas and reasons in their science notebooks.</p> <p>d. Whole group: “Let’s hear your ideas and reasoning. Where do you think the big and small cottonwood seeds will land? Which of the three environments will give the seeds a better</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>chance of surviving and growing into new cottonwood trees?”</p> <p>e. After participants share their ideas, have them turn to lesson 4a in their lesson plans binders and review the prediction strategy the teacher uses with students to show where they think the big and small cottonwood seeds will land and which environment will give them a better chance of surviving. Then ask participants to look through the rest of the lesson and review how students are asked to record and share their predictions.</p> <p>Note: If time allows, have participants read through VPA lesson 4b and summarize key science ideas about the environment based on the lesson content.</p> <p>f. Invite participants to share their comments and observations.</p>
		<p style="text-align: center;">Reflect: Lesson-4 Focus Question</p> <p>What helps some cottonwood-tree seeds survive and grow while other seeds don't?</p>	<p>Display Slide 39. Reflect: Lesson-4 Focus Question (7 min)</p> <p>a. Review the focus question on the slide.</p> <p>b. Individuals: Have participants answer the question in their science notebooks and include evidence from today's investigation to support their ideas.</p> <p>c. Then have participants read the ideal student response to the focus question and the science content storyline on the overview page of lesson 4a. Afterward, give them time to revise their responses, if desired.</p> <p>d. Whole group: Invite participants to share their ideas and evidence with the group.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p style="background-color: #d3d3d3; margin: 0; padding: 2px;">Reflect: Content Deepening Focus Question</p> <p>How can trait variations affect which plants or animals of the same kind survive long enough to reproduce?</p>	<p>Display Slide 40. Reflect: Content Deepening Focus Question (8 min)</p> <ol style="list-style-type: none"> a. Review the focus question on the slide. b. Pairs: Ask participants to pair up with an elbow partner and share their ideas for answering the question. Make sure they include evidence from today's investigation to support their ideas. Then have them record their answers in their notebooks. c. Whole group: Invite a few participants to share their ideas and evidence with the group. d. As participants share their responses, record key ideas on chart paper. Remind others to listen carefully to the responses and be prepared to agree, disagree, or add ideas from the investigations. e. If time allows, have participants review the student and teacher learning goals in their lesson plans binders (pretabs section). Then discuss which goals have been addressed in the content deepening sessions so far.
<p>1:15–3:15 120 min (Includes 10-min break)</p> <p>Lesson Analysis: SCSL Strategy C</p>	<p>Purpose</p> <ul style="list-style-type: none"> • Use lesson analysis of classroom videos to better understand SCSL strategy C. • Deepen participants' science-content knowledge of variations in plants and animals through lesson analysis. <p>Content</p> <ul style="list-style-type: none"> • To reflect the purpose and key 	<p style="background-color: #d3d3d3; margin: 0; padding: 2px;">Lesson Analysis: Focus Question 2</p> <p>How can selecting appropriate science activities help students develop a coherent science content storyline?</p>	<p>Display Slide 41. Lesson Analysis: Focus Question 2 (1 min)</p> <ol style="list-style-type: none"> a. Read the focus question on the slide. b. "To help us answer this question, we're going to explore STeLLA strategy C: Select activities that are matched to the learning goal."

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
Slides 41–47	<p>features of strategy C, activities should be selected that can help students engage in making sense of the main learning goal, not because they're fun, easy to do, or only topically related.</p> <p>What Participants Do</p> <ul style="list-style-type: none"> • Make and discuss a chart summarizing the purpose and key features of strategy C. • Use the criteria in Analysis Guide C to analyze video clips from a VPA lesson (before, during, and after an activity). • Identify activities that are <i>not</i> matched to the lesson's main learning goal. <p>Videos</p> <ul style="list-style-type: none"> • Video Clip 6.3, Bernstein classroom (before activity) • Video Clip 6.4, Bernstein classroom (during activity) • Video Clip 6.5, Bernstein classroom (after activity) <p>Handouts in PD Binder</p> <ul style="list-style-type: none"> • 6.4 Analysis Guide C • 6.5 Transcript for Video Clip 6.3 • 6.6 Transcript for Video Clip 6.4 • 6.7 Transcript for Video Clip 6.5 <p>PD Leader Masters</p> <ul style="list-style-type: none"> • PD Leader Master: Analysis Guide C: Selecting Activities Matched to the Learning Goal (Answer Key) 	<p>Strategy C: Purpose and Key Features</p> <p>According to the strategies booklet, what are the purpose and key features of strategy C: Select activities that are matched to the learning goal?</p>	<p>Display Slide 42. Strategy C: Purpose and Key Features (25 min)</p> <ol style="list-style-type: none"> Ask participants to locate the section on strategy C in the STeLLA strategies booklet. Have one participant lead the group in creating a chart that summarizes the purpose and key features of strategy C: Select activities that are matched to the learning goal. Ask: "What does the strategies booklet say about science activities that are fun and engaging for students?" <ul style="list-style-type: none"> Ideal responses: <ul style="list-style-type: none"> • Activities should be selected because they can support students in understanding the main learning goal, <i>not</i> because they're fun or easy to do. • Avoid activities that are only topically related (e.g., something about plants); instead, activities should focus on a specific science idea that is closely linked to the main learning goal (e.g., Plants get their food by making it out of carbon dioxide, water, and light energy). • Activities should not just be interesting supplements to the science content storyline; they should help develop it. Follow-up: "Think back on science-lab activities in high school or college. Did these activities play a key role in helping you better understand the science concepts presented in textbooks or lectures? Or were they more like add-on activities that were only loosely related to the science concepts being taught?"

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	<p>Supplies</p> <ul style="list-style-type: none"> • Chart paper and markers <p>PD Resources</p> <ul style="list-style-type: none"> • STeLLA strategies booklet <p>Resources in Lesson Plans Binder</p> <p><i>Resources section:</i></p> <ul style="list-style-type: none"> • Content background document 	<p style="text-align: center;">Lesson Analysis Question</p> <p>Main learning goal: Plants or animals of the same group share similar characteristics or traits that we can recognize. They also have variations in traits that help them survive.</p> <p>Focus questions: How are sunflowers alike and different? What traits and variations do they have?</p> <p>Analysis question: Is the activity well matched to the main learning goal?</p>	<p>Display Slide 43. Lesson Analysis Question (2 min)</p> <p>a. For this lesson analysis, participants will view a set of three video clips from one VPA lesson.</p> <p>b. Review the main learning goal and focus questions on the slide. Then introduce the analysis question: <i>Is the activity well matched to the main learning goal?</i></p>
10-MINUTE BREAK			
		<p style="text-align: center;">Lesson Analysis: Strategy C</p> <ol style="list-style-type: none"> 1. Write this main learning goal at the top of Analysis Guide C (handout 6.4): <ul style="list-style-type: none"> • <i>Plants or animals of the same group share similar characteristics or traits we can recognize. They also have variations in traits that help them survive.</i> 2. For this analysis, we'll watch three video clips from the same VPA lesson. 3. Before each clip: Read the lesson context at the top of the corresponding video transcript. 4. After each clip: Complete part 1 of the analysis guide. <p style="font-size: small; margin-left: 20px;">Links to video clips: 6.3_mscpcp_gr1.tav_bernstein_L2_c2; 6.4_mscpcp_gr1.tav_bernstein_L2_c3; 6.5_mscpcp_gr1.tav_bernstein_L2_c4</p> 	<p>Display Slide 44. Lesson Analysis: Strategy C (60 min)</p> <p>Note: Refer to the VPA content background document as needed throughout this lesson analysis.</p> <p>a. Have participants locate Analysis Guide C (handout 6.4) in their PD binders and write the main learning goal for the selected VPA lesson at the top. Then orient them to part 1 of the analysis guide.</p> <p>b. Before each video clip: Have participants read the lesson context at the top of the corresponding video transcript (handout 6.5 for clip 3, handout 6.6 for clip 4, and handout 6.7 for clip 5).</p> <p>c. Show each video clip.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p style="text-align: center;">Lesson Analysis: Strategy C</p> <p>Discuss these questions with a partner:</p> <ol style="list-style-type: none"> 1. Were the activities well matched to the learning goal? Provide evidence to support your response. 2. Suggest ways to improve the match between the activities and the main learning goal (part 2, Analysis Guide C). <p>Be prepared to share your ideas in a group discussion.</p>	<p>d. After each clip (individuals or pairs): Allow time for participants to review the analysis guide, write down science ideas revealed in the activity, and assess how well matched these ideas are to the main learning goal.</p> <p>Note: For sample responses to the analysis-guide questions, see PD Leader Master: Analysis Guide C: Selecting Activities Matched to the Learning Goal (Answer Key).</p> <hr/> <p>Display Slide 45. Lesson Analysis: Strategy C (10 min)</p> <ol style="list-style-type: none"> a. Pairs: “Discuss the questions on the slide and be ready to share your ideas with the group.” b. Whole group: Assess how well the activities in the video clips matched the main learning goal and ask participants to offer suggestions for improving the match. <p>Key ideas:</p> <ul style="list-style-type: none"> • During clip 1, students still seemed to be having difficulty with the concept of traits, so adding variation to the mix was confusing. We need to make sure that students understand that plants or animals of the same group or kind (species) share recognizable traits, and that students are able to demonstrate this understanding by describing traits in pictures <i>before</i> talking about variations in those traits, which is the primary focus of the main learning goal. • These activities didn’t focus on the link between trait variation and the ability of individual plants or animals to survive long enough to produce babies or seeds. • It’s unclear in the video clips whether students

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>analyze the flower data they collected.</p> <p>Note: Also see PD Leader Master: Analysis Guide C: Selecting Activities Matched to the Learning Goal (Answer Key).</p>
		<p>Lesson Analysis: Strategy C</p> <p>Study the video transcripts again and gather evidence to answer these questions:</p> <ul style="list-style-type: none"> • What kept students focused on the main learning goal? • What distracted students from the learning goal? 	<p>Display Slide 46. Lesson Analysis: Strategy C (5 min)</p> <p>a. Read the questions on the slide.</p> <p>b. Individuals: Direct participants to look for evidence in the video transcripts that will help them answer these questions.</p> <p>c. Whole group: Ask one or two participants to share their ideas and evidence in response to the questions.</p>
		<p>Practice: Strategy C</p> <p>Main learning goal: Plants or animals of the same group share similar characteristics or traits we can recognize. They also have variations in traits that help them survive.</p> <p>Candidate activities:</p> <ol style="list-style-type: none"> 1. Students draw a monster. Then they compare their drawings and group them according to similarities. 2. Students bring pictures of their pets to class and identify similarities and differences among them. <p>Questions:</p> <ul style="list-style-type: none"> • How well does the activity match the main learning goal? • How might the activity be changed to better match the main learning goal? 	<p>Display Slide 47. Practice: Strategy C (7 min)</p> <p>Note: This activity may be skipped if time is running short.</p> <p>a. Individuals (2–3 min): “Think about how well the activities on this slide are matched to the main learning goal. Be prepared to give a rationale for your choices.”</p> <p>b. Whole group: Invite participants to share their ideas and reasoning with the group.</p> <p>Ideal responses:</p> <ul style="list-style-type: none"> • Neither activity is well matched to the main learning goal. • Both activities should focus not just on similarities and differences but on variations in traits that help individual plants or animals survive.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
<p>3:15–3:30 15 min</p> <p>Wrap-Up: Summary, Homework, and Reflections</p> <p>Slides 48–51</p>	<p>Purpose</p> <ul style="list-style-type: none"> Summarize and reflect on key ideas about STeLLA strategies B, I, 7, and C and the VPA science content. <p>What Participants Do</p> <ul style="list-style-type: none"> Review today’s focus questions. Share key ideas about strategies B, I, 7, and C from the lesson analysis and content deepening work. Copy down the homework assignment for day 7. Write reflections on today’s learning. <p>Handouts in PD Binder</p> <ul style="list-style-type: none"> 6.8 Daily Reflections—Day 6 <p>Supplies</p> <ul style="list-style-type: none"> Science notebooks 	<p>Today’s Focus Questions</p> <ul style="list-style-type: none"> How can we begin and end a lesson to help students develop a coherent science content storyline? How can selecting appropriate science activities help students develop a coherent science content storyline? How can trait variations affect which plants or animals of the same kind survive long enough to reproduce? <p>Summarize Today’s Work</p> <p>Hold up three fingers when you have all of these in mind:</p> <ol style="list-style-type: none"> One idea you’re taking away about strategy C: Select activities that are matched to the learning goal One idea you’re taking away about strategies B, I, and 7: <ul style="list-style-type: none"> Set the purpose with a focus question or goal statement (strategy B) Summarize key science ideas (strategy I) Engage students in making connections by synthesizing and summarizing key science ideas (strategy 7) One science idea about variations that you’re taking away from today’s content deepening work. 	<p>Display Slide 48. Today’s Focus Questions (Less than 1 min)</p> <p>a. Remind participants of today’s focus questions.</p> <p>Display Slide 49. Summarize Today’s Work (7 min)</p> <p>a. Individuals: Read the instructions on the slide and give participants enough time to come up with three ideas to summarize today’s work.</p> <p>b. Whole group: In a round-robin, invite participants to share a key idea for each category on the slide. (Allow participants to pass if they wish.)</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p>Homework</p> <ul style="list-style-type: none"> In the STeLLA strategies booklet, read about SCSL strategy D: <i>Select content representations and models matched to the learning goal and engage students in their use.</i> Fill in the appropriate column on your SCSL Z-fold summary chart. 	<p>Display Slide 50. Homework (Less than 1 min)</p> <ol style="list-style-type: none"> Go over the homework assignment and have participants write it in their notebooks. Make sure participants understand each part of the assignment.
		<p>Reflections on Today's Session</p> <ul style="list-style-type: none"> How are STeLLA strategies B, I, 7, and C related to one another? What new insights or questions have emerged about trait variations in plants and animals? Only two more days are left of our time together at the Summer Institute. What burning questions do you think should be answered before the end of the week? 	<p>Display Slide 51. Reflections on Today's Session (7 min)</p> <ol style="list-style-type: none"> Allow participants at least 5 minutes to think about today's session and write their reflections and feedback on the Daily Reflections sheet (handout 6.8 in PD program binder).