

## RESPeCT Summer Institute Professional Development Leader Guide (PDLG)


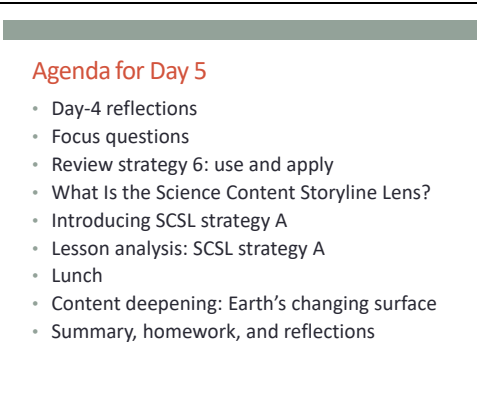
<b>Grade Level</b>	2	<b>Day</b>	5	<b>STeLLA Strategy</b>	Science Content Storyline Lens (SCSL) Strategy A: Identify One Main Learning Goal	<b>Subject Matter Focus</b>	Earth's Changing Surface (ECS)
<b>Focus Questions</b>	<ul style="list-style-type: none"> <li>What is the Science Content Storyline Lens (SCSL)?</li> <li>Why is one main learning goal essential for science content storyline coherence?</li> <li>What does the surface of Earth look like?</li> <li>How can we make models out of sand to show the shapes of different landforms?</li> <li>How does the land on Earth's surface look different in different places?</li> </ul>						
<b>Main Learning Goals</b>	<p>Participants will understand the following:</p> <ul style="list-style-type: none"> <li>Research from the TIMSS Video Study of Science Teaching emphasizes the importance of creating science content storylines that support students in making links between classroom activities and science ideas.</li> <li>The SCS Lens and strategies empower teachers to think in new ways about planning and teaching science lessons.</li> <li>Identifying and focusing on one main learning goal in a lesson is an important strategy for creating a coherent science content storyline.</li> <li>Earth's surface has many different kinds of landforms, such as mountains, hills, valleys, canyons, plateaus, plains, rivers, and lakes.</li> <li>Landforms, including bodies of water, look different in different places. Some landforms rise high above Earth's surface, some are flat, and others cut deep into the surface. Some places have many bodies of water, and others don't.</li> </ul>						
<b>Preparation</b>			<b>Materials</b>			<b>Videos</b>	
<p><b>Daily Setup Tasks</b></p> <ul style="list-style-type: none"> <li>Check that video clips are correctly linked to PowerPoint (PPT) slides.</li> <li>Set up PowerPoint.</li> <li>Make sure video clips play correctly with good sound.</li> <li>Arrange furniture and food.</li> <li>Arrange participant materials.</li> <li>Put up posters and charts.</li> </ul> <p><b>Planning and Preparation Tasks</b></p> <ul style="list-style-type: none"> <li>Study the PDLG, PowerPoint slides (PPTs), video clips, and handouts. Make changes to PPTs if needed.</li> <li>Review the reflections from day 4 and create a summary slide.</li> </ul>			<p><b>Posters and Charts</b></p> <ul style="list-style-type: none"> <li>STeLLA Framework and Strategies poster</li> <li>Day-5 Agenda (chart)</li> <li>Norms for Working Together (chart)</li> <li>Day-5 Focus Questions (chart)</li> <li>Effective Science Teaching chart (from day 1)</li> <li>Strategy charts from days 1–4 (STL strategies 1–6)</li> <li>Parking Lot poster</li> </ul> <p><b>Handouts in RESPeCT PD Binder Front Pocket</b></p> <ul style="list-style-type: none"> <li>Z-fold summary chart: Science Content Storyline Lens Strategies (blank)</li> </ul> <p><b>Handouts in RESPeCT PD Binder, Day 5</b></p> <ul style="list-style-type: none"> <li>5.1 Analysis Guide A: Identifying One Main Learning</li> </ul>			<ul style="list-style-type: none"> <li>Video clips from the same ECS lesson:                             <ul style="list-style-type: none"> <li><a href="#">Video Clip 5.1</a>: Poulsen classroom (beginning of lesson); 5.1_mspcp_gr.2_ecs_poulsen_L5_c2</li> <li><a href="#">Video Clip 5.2</a>: Poulsen classroom (during lesson); 5.2_mspcp_gr.2_ecs_poulsen_L5_c3</li> <li><a href="#">Video Clip 5.3</a>: Poulsen classroom (end of lesson); 5.3_mspcp_gr.2_ecs_poulsen_L5_c4</li> </ul> </li> </ul>	

<ul style="list-style-type: none"> <li>• Watch video clips and anticipate participant responses.</li> <li>• Prepare charts for the day’s agenda and focus questions.</li> <li>• Review the activities for ECS lessons 1a/b and 2a/b in the lesson plans binder.</li> <li>• For content deepening: <ul style="list-style-type: none"> <li>• Photocopy and laminate the landform picture cards from handout 5.6 and landform labels from handout 5.7 (1 set per pair).</li> <li>• Prepare four trays of dampened play sand for each small group. Divide the sand equally among the trays and place each pile of sand in the middle of the tray. Make sure there’s enough sand on each tray to make one landform.</li> </ul> </li> </ul>	<p>Goal (2 copies)</p> <ul style="list-style-type: none"> <li>• 5.2 Practice Identifying One Main Learning Goal</li> <li>• 5.3 Transcript for Video Clip 5.1</li> <li>• 5.4 Transcript for Video Clip 5.2</li> <li>• 5.5 Transcript for Video Clip 5.3</li> <li>• 5.6 Landform Picture Cards (from lessons 1a/b)</li> <li>• 5.7 Landform Labels (4 labels per group corresponding to the picture cards)</li> <li>• 5.8 Extended Homework: RESPeCT Lesson Plan Analysis</li> <li>• 5.9 Daily Reflections—Day 5</li> </ul> <p><b>Handouts in RESPeCT Lesson Plans Binder</b></p> <ul style="list-style-type: none"> <li>• 2.1 Land Detectives (from ECS lesson 2a)</li> <li>• 2.4 Land Detectives (from ECS lesson 2b)</li> </ul> <p><b>PD Leader Masters, Days 5–8</b></p> <ul style="list-style-type: none"> <li>• PD Leader Master: Practice Identifying One Main Learning Goal (Answer Key)</li> </ul> <p><b>Supplies</b></p> <ul style="list-style-type: none"> <li>• Science notebooks</li> <li>• Chart paper and markers</li> <li>• For content deepening landform-model activity: <ul style="list-style-type: none"> <li>• Blue plastic tablecloths (1 per group)</li> <li>• 3 bags of play sand, dampened and divided equally among 4 trays per group</li> </ul> </li> <li>• For content deepening land-detectives activity: <ul style="list-style-type: none"> <li>• Plastic relief map of the United States (1 per group)</li> </ul> </li> </ul> <p><b>PD Resources</b></p> <ul style="list-style-type: none"> <li>• STeLLA strategies booklet</li> <li>• RESPeCT PD program binder</li> <li>• RESPeCT lesson plans binder</li> </ul> <p><b>Resources in Lesson Plans Binder</b></p> <p><i>Resources section:</i></p> <ul style="list-style-type: none"> <li>• Earth’s Changing Surface Content Background Document</li> <li>• Common Student Ideas about Earth’s Changing Surface</li> </ul>	
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## DAY 5 SESSION OUTLINE

Time	Activities	Purpose
8:00–8:25 25 min	<b>Getting Started: Housekeeping, Agenda, Day-4 Reflections, Norms, Focus Questions</b>	<ul style="list-style-type: none"> <li>• Build community by sharing participants' reflections from day 4.</li> <li>• Set the stage for a day of learning.</li> </ul>
8:25–8:40 15 min	<b>Review of Strategy 6: Use and Apply</b>	<ul style="list-style-type: none"> <li>• Review STL strategy 6 (use and apply) and deepen participants' understandings of this strategy and the Properties of Matter lesson content.</li> </ul>
8:40–8:55 15 min	<b>What Is the Science Content Storyline Lens (SCSL)?</b>	<ul style="list-style-type: none"> <li>• Help participants develop strong initial understandings of the Science Content Storyline Lens.</li> </ul>
8:55–10:10 75 min (Includes 10-min break)	<b>Introducing SCSL Strategy A</b>	<ul style="list-style-type: none"> <li>• Clarify and deepen participants' understandings of SCSL strategy A: Identify one main learning goal.</li> <li>• Clarify the distinctions between science ideas, student ideas, and main learning goals.</li> </ul>
10:10–12:00 110 min	<b>Lesson Analysis: SCSL Strategy A</b>	<ul style="list-style-type: none"> <li>• Use lesson analysis of classroom videos to better understand SCSL strategy A.</li> <li>• Deepen participants' science-content knowledge of Earth's changing surface through lesson analysis.</li> </ul>
12:00–12:45 45 min	<b>LUNCH</b>	
12:45–3:10 145 min (Includes 10-min break)	<b>Content Deepening: Earth's Changing Surface</b>	<ul style="list-style-type: none"> <li>• Deepen participants' understandings of the science content that is part of the Earth's Changing Surface lesson series.</li> <li>• Deepen participants' science-content knowledge by conducting investigations from ECS lessons 1a/b and 2a/b.</li> </ul>
3:10–3:30 20 min	<b>Wrap-Up: Summary, Homework, and Reflections</b>	<ul style="list-style-type: none"> <li>• Summarize and reflect on key ideas from today's learning, including the Science Content Storyline Lens, STeLLA strategy A, and the ECS science content.</li> </ul>

**DAY 5**

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
<p>8:00–8:25 25 min</p> <p><b>Getting Started</b></p> <p>Slides 1–8</p>	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>• Build community by sharing participants’ reflections from day 4.</li> <li>• Set the stage for a day of learning.</li> </ul> <p><b>What Participants Do</b></p> <ul style="list-style-type: none"> <li>• Review the day’s agenda.</li> <li>• Discuss the reflections from day 4.</li> <li>• Review and discuss progress on the RESPeCT program norms.</li> <li>• Read the focus questions for day 5.</li> </ul> <p><b>Posters and Charts</b></p> <ul style="list-style-type: none"> <li>• STeLLA Framework and Strategies poster</li> <li>• Day-5 Agenda (chart)</li> <li>• Norms for Working Together (chart)</li> <li>• Day-5 Focus Questions (chart)</li> </ul>	 <p><b>RESPeCT PD PROGRAM</b></p> <p>Day 5</p> <p>RESPeCT Summer Institute</p>  <p><b>Agenda for Day 5</b></p> <ul style="list-style-type: none"> <li>• Day-4 reflections</li> <li>• Focus questions</li> <li>• Review strategy 6: use and apply</li> <li>• What Is the Science Content Storyline Lens?</li> <li>• Introducing SCSL strategy A</li> <li>• Lesson analysis: SCSL strategy A</li> <li>• Lunch</li> <li>• Content deepening: Earth’s changing surface</li> <li>• Summary, homework, and reflections</li> </ul>	<p><b>Display Slide 1.</b> RESPeCT PD Program (5 min)</p> <p>a. Take care of any housekeeping issues.</p> <p><b>Display Slide 2.</b> Agenda for Day 5 (2 min)</p> <p>a. Talk through the agenda for the day.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process																				
		<div style="border: 1px solid gray; padding: 5px;"> <p style="margin: 0;"><b>Trends in Reflections</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Lesson Analysis</th> <th style="width: 50%; text-align: center;">Science Content Learning</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> </div>	Lesson Analysis	Science Content Learning																			<p><b>Display Slide 3.</b> Trends in Reflections (5 min)</p> <p>a. Give participants time to review your feedback on their reflections from day 4 and offer reactions, comments, or follow-up questions.</p>
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		<div style="border: 1px solid gray; padding: 5px;"> <p style="margin: 0;"><b>Norms for Working Together: The Basics</b></p> <p><b>Purpose:</b> Build trust and develop a productive study group for all participants.</p> <p><b>The Basics</b></p> <ul style="list-style-type: none"> <li>• Arrive prepared and on time; stay for the duration; return from breaks on time.</li> <li>• Remain attentive, thoughtful, and respectful; engage and be present.</li> <li>• Eliminate interruptions (turn off cell phones, email, and other electronic devices; avoid sidebar conversations).</li> <li>• Make room for everyone to participate (monitor your floor time).</li> </ul> </div>	<p><b>Display Slide 4.</b> Norms for Working Together: The Basics (5 min)</p> <p>a. Review the norms as a group.</p> <p>b. <b>Ask:</b> “Any comments or suggested changes? How are we doing with applying these norms?”</p>																				

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		<p><b>Norms for Working Together: The Heart</b></p> <p><b>Purpose:</b> Build trust and develop a productive study group for all participants.</p> <p><b>The Heart of RESPeCT Lesson Analysis and Content Deepening</b></p> <ul style="list-style-type: none"> <li>• Keep the goal in mind: analysis of teaching to improve student learning.</li> <li>• Share your ideas, uncertainties, confusion, disagreements, questions, and good humor. All points of view are welcome.</li> <li>• Expect and ask questions to deepen everyone’s learning; be constructively challenging.</li> <li>• Listen carefully; seek to understand other participants’ points of view.</li> </ul>	<p><b>Display Slide 5.</b> Norms for Working Together: The Heart (5 min)</p> <p>a. Review these norms as a group.</p> <p>b. <b>Ask:</b> “Any comments or suggested changes? Which of these norms do you think we could get better at applying individually and as a group?”</p> <p>c. <b>Remind participants:</b> “These norms will become increasingly important during the Summer Institute and throughout the academic year as we analyze one another’s classroom videos and learn together.”</p>																				
		<p><b>STeLLA Conceptual Framework</b></p> <p>Learning to analyze science teaching through two lenses</p> <p>allows you to learn and use strategies for more effective science teaching</p> <table border="1"> <thead> <tr> <th data-bbox="934 933 1060 950">STRATEGIES TO REVEAL, SUPPORT, AND CHALLENGE STUDENT THINKING</th> <th data-bbox="1071 933 1197 950">STRATEGIES TO CREATE A COHERENT SCIENCE CONTENT STORYLINE</th> </tr> </thead> <tbody> <tr> <td data-bbox="934 958 1060 974">1. Ask questions to elicit student ideas and predictions.</td> <td data-bbox="1071 958 1197 974">A. Identify one main learning goal.</td> </tr> <tr> <td data-bbox="934 982 1060 998">2. Ask questions to probe student ideas and predictions.</td> <td data-bbox="1071 982 1197 998">B. Set the disposition with a focus question or goal statement.</td> </tr> <tr> <td data-bbox="934 1006 1060 1023">3. Ask questions to challenge student thinking.</td> <td data-bbox="1071 1006 1197 1023">C. Select activities that are matched to the learning goal.</td> </tr> <tr> <td data-bbox="934 1031 1060 1047">4. Engage students in analyzing and interpreting data and observations.</td> <td data-bbox="1071 1031 1197 1047">D. Select content representations and models matched to the learning goal and engage students to test use.</td> </tr> <tr> <td data-bbox="934 1055 1060 1071">5. Engage students in constructing explanations and arguments.</td> <td data-bbox="1071 1055 1197 1071">E. Sequence key science ideas and activities appropriately.</td> </tr> <tr> <td data-bbox="934 1079 1060 1096">6. Engage students in using and applying new science ideas in a variety of ways and contexts.</td> <td data-bbox="1071 1079 1197 1096">F. Make explicit ties between science ideas and activities.</td> </tr> <tr> <td data-bbox="934 1104 1060 1120">7. Engage students in making connections by synthesizing and summarizing key science ideas.</td> <td data-bbox="1071 1104 1197 1120">G. Link science ideas to other science ideas.</td> </tr> <tr> <td data-bbox="934 1128 1060 1144">8. Engage students in communicating in scientific ways.</td> <td data-bbox="1071 1128 1197 1144">H. Highlight key science ideas and focus question throughout.</td> </tr> <tr> <td></td> <td data-bbox="1071 1153 1197 1169">I. Summarize key science ideas.</td> </tr> </tbody> </table>	STRATEGIES TO REVEAL, SUPPORT, AND CHALLENGE STUDENT THINKING	STRATEGIES TO CREATE A COHERENT SCIENCE CONTENT STORYLINE	1. Ask questions to elicit student ideas and predictions.	A. Identify one main learning goal.	2. Ask questions to probe student ideas and predictions.	B. Set the disposition with a focus question or goal statement.	3. Ask questions to challenge student thinking.	C. Select activities that are matched to the learning goal.	4. Engage students in analyzing and interpreting data and observations.	D. Select content representations and models matched to the learning goal and engage students to test use.	5. Engage students in constructing explanations and arguments.	E. Sequence key science ideas and activities appropriately.	6. Engage students in using and applying new science ideas in a variety of ways and contexts.	F. Make explicit ties between science ideas and activities.	7. Engage students in making connections by synthesizing and summarizing key science ideas.	G. Link science ideas to other science ideas.	8. Engage students in communicating in scientific ways.	H. Highlight key science ideas and focus question throughout.		I. Summarize key science ideas.	<p><b>Display Slide 6.</b> STeLLA Conceptual Framework (2 min)</p> <p>a. <b>Transition:</b> This slide marks the transition from the STL strategies to the Science Content Storyline Lens strategies.</p> <p>b. “Throughout the PD program, we’ll continue learning about the Student Thinking Lens (STL) strategies, but today we’ll transition to the Science Content Storyline Lens strategies.”</p> <p>c. Highlight the SCSL strategies on the slide.</p>
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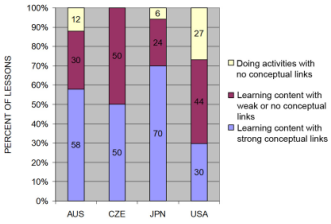
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p><b>Focus for the Week</b></p> <ul style="list-style-type: none"> <li>• Content area 2: Earth’s changing surface (ECS)</li> <li>• Science Content Storyline Lens <ul style="list-style-type: none"> <li>• Strategies A, B, C, D, F, G, H, and I</li> <li>• Video-based lesson analysis (ECS lessons)</li> </ul> </li> <li>• ECS lesson plans review (last day)</li> <li>• Academic-year schedule (last day) <ul style="list-style-type: none"> <li>• Video recording</li> <li>• Study-group sessions</li> </ul> </li> </ul>	<p><b>Display Slide 7.</b> Focus for the Week (1 min)</p> <p>a. “This week we’ll focus on a new content area: Earth’s changing surface. We’ll also examine the Science Content Storyline Lens strategies and the ECS lessons you’ll be teaching in the fall, analyze video clips of those lessons, and deepen your science-content knowledge related to the lesson plans.”</p> <p>b. “On the last day of the RESPeCT PD program, we’ll review the lesson plans and the schedule for the academic year.”</p> <p>c. “You may notice that we skip strategy E: Sequence key science ideas and activities appropriately. This strategy will be addressed during the school year as you teach the STeLLA lesson plans and analyze how they’re sequenced within each lesson and across lessons.”</p>
		<p><b>Today’s Focus Questions</b></p> <ul style="list-style-type: none"> <li>• What is the Science Content Storyline Lens (SCSL)?</li> <li>• Why is one main learning goal essential for science content storyline coherence?</li> <li>• What does the surface of Earth look like?</li> <li>• How can we make models out of sand to show the shapes of different landforms?</li> <li>• How does the land on Earth’s surface look different in different places?</li> </ul>	<p><b>Display Slide 8.</b> Today’s Focus Questions (1 min)</p> <p>a. Introduce the focus questions that will guide today’s work.</p>

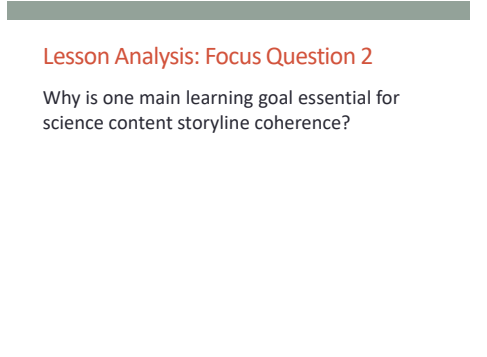
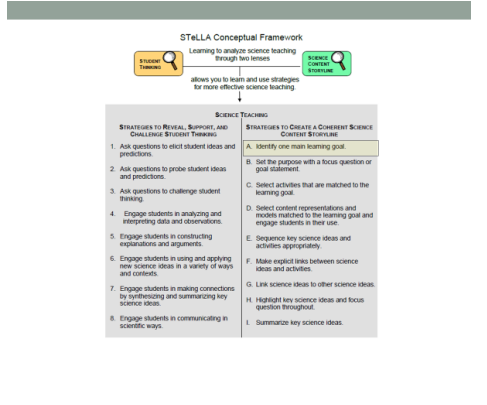
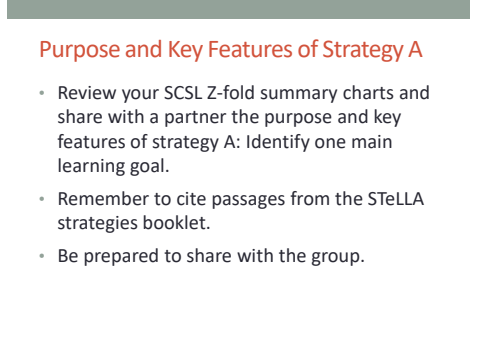
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
8:25–8:40 15 min  <b>Review of Strategy 6: Use and Apply</b>  Slides 9–10	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>Review STL strategy 6 (use and apply) and deepen participants’ understandings of this strategy and the Properties of Matter lesson content.</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>STL strategy 6 engages students in using and applying new science ideas in a variety of ways and contexts.</li> </ul> <p><b>What Participants Do</b></p> <ul style="list-style-type: none"> <li>Take a multiple-choice quiz to check their understanding of STL strategy 6.</li> <li>Work on a scenario that engages them in using and applying strategy 6 and the Properties of Matter lesson content.</li> </ul> <p><b>Supplies</b></p> <ul style="list-style-type: none"> <li>Science notebooks</li> </ul>	<p><b>Check Your Understanding of Strategy 6</b></p> <p>Jot down your responses to this multiple-choice quiz:</p> <ol style="list-style-type: none"> <li>Use-and-apply tasks are used <b>[before/during/after]</b> new science ideas are introduced.</li> <li>For difficult content ideas, students might need to practice applying new ideas in <b>[one/two/many]</b> different contexts.</li> <li><b>[True/false]:</b> Use-and-apply questions or activities are used primarily for student assessment at the end of a unit.</li> <li>It’s appropriate for teachers to ask <b>[elicit/probe/challenge]</b> questions during a use-and-apply activity.</li> <li>Teachers should <b>[never/judiciously/always]</b> tell students about science ideas they are missing or stating inaccurately.</li> </ol>	<p><b>Display Slide 9.</b> Check Your Understanding of Strategy 6 (7 min)</p> <p><b>Note:</b> Display this slide only if it wasn’t used on day 4.</p> <ol style="list-style-type: none"> <li>“To check your understanding of STL strategy 6, jot down your responses to this multiple-choice quiz in your science notebooks.”</li> <li>Have participants discuss their answers either in pairs or as a group. (If time is short, just read the answers aloud.)</li> </ol> <p><b>Answer key:</b></p> <ol style="list-style-type: none"> <li>After</li> <li>Many</li> <li>False</li> <li>Challenge (and probe)</li> <li>Judiciously (defined as “good or discriminating judgment; wise, sensible, or well advised”)</li> </ol>
		<p><b>Use and Apply Your Content Deepening Knowledge</b></p> <p><b>Scenario:</b> You light a candle for dinner and notice the wax melting as you’re eating. What do you think is happening to the matter in the candle?</p> <ul style="list-style-type: none"> <li>Use and apply what you learned about matter last week to answer this question. Write down your explanation in your science notebook using bullet points. Make sure to include science ideas in your explanation.</li> <li>Then share your ideas with a partner and note any questions that arise.</li> </ul>	<p><b>Display Slide 10.</b> Use and Apply Your Content Deepening Knowledge (8 min)</p> <ol style="list-style-type: none"> <li>Introduce the use-and-apply scenario on the slide.</li> <li><b>Individuals (3 min):</b> “Reflect on what you learned about matter last week; then jot down your explanation in your science notebooks using bullet points. Make sure to include science ideas in your explanations.”</li> <li><b>Turn and Talk (2 min):</b> Have participants pair up with an elbow partner and share their</li> </ol>



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			<p>solutions for the use-and-apply scenario.</p> <p>d. <b>Whole-group share-out (3 min):</b> “What ideas do you have for solving this mystery?”</p> <p><b>Ideal response:</b></p> <ul style="list-style-type: none"> <li>• The burning candle is an example of physical and chemical changes in matter. First, when heat is added to the solid candle wax, the wax melts into liquid wax. This is a physical change. A chemical change occurs as the liquid wax turns into a gas through combustion (by means of the burning wick). Wax is mostly made of hydrogen and carbon atoms (called <i>hydrocarbons</i>), which recombine with oxygen from the air during a chemical reaction and change into water vapor (H<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>) as the candle burns. Over time, the mass of the candle decreases as the matter (wax) changes into different gases.</li> </ul> <p><b>Common problems:</b></p> <ul style="list-style-type: none"> <li>• Participants might focus only on the physical change: solid wax melting into liquid wax.</li> <li>• Participants might focus on the candle flame and think about combustion, but they might not be able to explain the chemical change.</li> <li>• Most participants will be unfamiliar with the chemical structure of wax (hydrocarbons) and won't know that as it burns during combustion, hydrocarbons recombine to form water vapor and carbon dioxide. This is the hardest part of the example to understand.</li> </ul>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
<p>8:40–8:55 15 min</p> <p><b>What Is the Science Content Storyline Lens (SCSL)?</b></p> <p>Slides 11–13</p>	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>Help participants develop strong initial understandings of the Science Content Storyline Lens.</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>A science content storyline brings coherence within and across science lessons.</li> </ul> <p><b>What Participants Do</b></p> <ul style="list-style-type: none"> <li>Write about and discuss their typical process of planning science lessons.</li> <li>Discuss their reading about the definition of a science content storyline.</li> <li>Review and discuss the TIMSS (Trends in Mathematics and Science Study) research basis for the Science Content Storyline Lens.</li> </ul> <p><b>Posters and Charts</b></p> <ul style="list-style-type: none"> <li>STeLLA Framework and Strategies poster</li> </ul> <p><b>PD Resources</b></p> <ul style="list-style-type: none"> <li>STeLLA strategies booklet</li> </ul>	<p><b>Planning Science Lessons: Quick Write</b></p> <p>What is generally your thinking process when you plan your science lessons?</p> <p>Be prepared to share your ideas with the group.</p> <hr/> <p><b>Lesson Analysis: Focus Question 1</b></p> <p>What is the Science Content Storyline Lens (SCSL)?</p> <ul style="list-style-type: none"> <li>What is a science content storyline, and why is it important?</li> <li>What is challenging about developing a science content storyline?</li> </ul>	<p><b>Display Slide 11.</b> Planning Science Lessons: Quick Write (6 min)</p> <p><b>Note:</b> This activity is a lead-in for thinking about specific SCSL strategies. When planning science lessons, are participants thinking primarily about (1) SCSL issues, such as learning goals, (2) student misconceptions (an STL issue), which is a great start but doesn't include SCSL strategies, or (3) activities and/or classroom management and timing issues?</p> <p>a. <b>Individuals:</b> Direct participants to take 2–3 minutes to write down the key things they think about when planning science lessons.</p> <p>b. <b>Whole group:</b> Ask participants to share their reflections with the group.</p> <p>c. <b>Tell participants:</b> “The Science Content Storyline Lens strategies should provide some new or additional ways of thinking about planning your science lessons.”</p> <hr/> <p><b>Display Slide 12.</b> Lesson Analysis: Focus Question 1 (7 min)</p> <p>a. <b>Small groups:</b> Direct half the group to focus on the first bulleted question on the slide, and the other half to focus on the second. Allow groups 2 minutes to think about their assigned questions as they review “Introduction to the Science Content Storyline Lens” in the STeLLA strategies booklet.</p> <p>b. <b>Whole group:</b> Have each group share their ideas and responses for these questions.</p> <p>c. As you listen to participants, make sure that</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process																				
		<p data-bbox="863 428 1268 485" style="text-align: center;">The TIMSS Video Study Findings and the Science Content Storyline Lens</p>  <table border="1" data-bbox="913 500 1241 722"> <caption>Percentage of Lessons by Country and Conceptual Link Type</caption> <thead> <tr> <th>Country</th> <th>Learning content with strong conceptual links</th> <th>Learning content with weak or no conceptual links</th> <th>Doing activities with no conceptual links</th> </tr> </thead> <tbody> <tr> <td>AUS</td> <td>58</td> <td>30</td> <td>12</td> </tr> <tr> <td>CZE</td> <td>50</td> <td>50</td> <td>0</td> </tr> <tr> <td>JPN</td> <td>70</td> <td>24</td> <td>6</td> </tr> <tr> <td>USA</td> <td>30</td> <td>44</td> <td>27</td> </tr> </tbody> </table>	Country	Learning content with strong conceptual links	Learning content with weak or no conceptual links	Doing activities with no conceptual links	AUS	58	30	12	CZE	50	50	0	JPN	70	24	6	USA	30	44	27	<p data-bbox="1362 241 1896 362">what they're saying is consistent with the strategies booklet. If you aren't sure they're interpreting the text accurately, ask them to identify the specific text they're drawing from.</p> <p data-bbox="1333 397 1913 488"><b>Display Slide 13.</b> The TIMSS Video Study Findings and the Science Content Storyline Lens (2 min)</p> <ol data-bbox="1333 537 1906 1300" style="list-style-type: none"> <li>Emphasize the research basis for the Science Content Storyline Lens and its importance. Remind participants that the data on the slide was presented on day 1 of the PD program.</li> <li><b>Ask:</b> “What does this graph reveal about US science lessons compared with higher-achieving countries?”  <b>Ideal response:</b> According to the study, US science lessons didn't do as well linking science ideas to lesson activities; in fact, many lessons were activity focused and included significantly fewer science ideas compared to other countries.</li> <li><b>Summarize:</b> Point to strategies F and G on the STeLLA strategies poster: Make explicit links between science ideas and activities (strategy F) and link science ideas to other science ideas (strategy G). These strategies and the idea of a Science Content Storyline Lens grew out of the TIMSS research findings.</li> <li>“Today we'll begin our study of the Science Content Storyline Lens, with a focus on strategy A: Identify one main learning goal.”</li> </ol>
Country	Learning content with strong conceptual links	Learning content with weak or no conceptual links	Doing activities with no conceptual links																				
AUS	58	30	12																				
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PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
<p>8:55–10:10 75 min (Includes 10-min break)</p> <p><b>Introducing SCSL Strategy A</b></p> <p>Slides 14–23</p>	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>Clarify and deepen participants' understandings of SCSL strategy A: Identify one main learning goal.</li> <li>Clarify the distinctions between science ideas, student ideas, and main learning goals.</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>A main learning goal is a big idea that students are expected to learn and take away from a lesson or series of lessons. Everything in the lesson supports the development of this one main learning goal.</li> </ul> <p><b>What Participants Do</b></p> <ul style="list-style-type: none"> <li>Make a chart highlighting the purpose and key features of SCSL strategy A.</li> <li>Review the differences and relationships among student ideas, science ideas, and main learning goals.</li> <li>Practice identifying student ideas and science ideas in a written list.</li> <li>Practice identifying strong main learning goals using the analysis guide for strategy A.</li> </ul> <p><b>Handouts in PD Binder</b></p> <ul style="list-style-type: none"> <li>5.1 Analysis Guide A</li> <li>5.2 Practice Identifying One Main Learning Goal</li> </ul> <p><b>PD Leader Masters</b></p>		<p><b>Display Slide 14.</b> Lesson Analysis: Focus Question 2 (1 min)</p> <p>a. Read the focus question on the slide.</p>
			<p><b>Display Slide 15.</b> STeLLA Conceptual Framework (1 min)</p> <p>a. “Now let’s dig into SCSL strategy A!”</p> <p>b. “As you can see, strategy A is the first of nine Science Content Storyline Lens strategies. It appears first because it’s the foundation on which all the other SCSL strategies are built. This will become clearer as we delve into the other strategies and see how important it is that each of them is matched to the lesson’s main learning goal.”</p>
			<p><b>Display Slide 16.</b> Purpose and Key Features of Strategy A (25 min)</p> <p>a. <b>Pairs:</b> “Share with a partner what you wrote on your Science Content Storyline Lens Z-fold summary chart about the purpose and key features of strategy A.”</p> <p>b. <b>Whole group:</b> Have one or two participant volunteers lead the group in creating a chart that describes the purpose and key features of</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	<ul style="list-style-type: none"> <li>• PD Leader Master: Practice Identifying One Main Learning Goal (Answer Key)</li> </ul> <p><b>Supplies</b></p> <ul style="list-style-type: none"> <li>• Chart paper and markers</li> </ul> <p><b>PD Resources</b></p> <ul style="list-style-type: none"> <li>• STeLLA strategies booklet</li> <li>• SCSL Z-fold summary chart (blank copy in front pocket of PD binder)</li> </ul> <p><b>Resources in Lesson Plans Binder</b></p> <p><i>Resources section:</i></p> <ul style="list-style-type: none"> <li>• Content background document</li> <li>• Common Student Ideas</li> </ul>	<div style="background-color: #cccccc; height: 15px; margin-bottom: 5px;"></div> <p><b>A Main Learning Goal Is ...</b></p> <ul style="list-style-type: none"> <li>• A big science idea that you want students to learn</li> <li>• A big idea that shows the relationship among science ideas</li> <li>• The focus of the lesson (or series of lessons)</li> <li>• Stated in a complete sentence (for planning purposes)</li> <li>• Stated by the teacher, a student, a text, or a multimedia resource</li> <li>• A support for teacher planning</li> </ul> <div style="background-color: #cccccc; height: 15px; margin-top: 10px;"></div> <p><b>A Main Learning Goal Is NOT ...</b></p> <ul style="list-style-type: none"> <li>• A topic or phrase</li> <li>• An activity</li> <li>• A question</li> <li>• A performance task or objective</li> <li>• A supporting detail, definition, or fact</li> <li>• A student misconception or idea that isn't scientifically accurate</li> </ul>	<p>strategy A.</p> <p>c. <b>Transition:</b> “Next, we’ll review the difference between a science idea and the main learning goal of a lesson. Then you’ll practice identifying and clarifying this distinction.”</p> <p><b>Display Slide 17.</b> A Main Learning Goal Is ... (1 min)</p> <p>a. “This slide lists some key ideas about the definition of a main learning goal.”</p> <p>b. Read through the ideas.</p> <p>c. <b>Emphasize:</b> “Notice the parenthetical reference to ‘lessons’ in the third bullet point. Each lesson should have only one main learning goal, but you might need two or more lessons to help students accomplish a difficult goal. So it’s often necessary to spend more than one lesson on a specific learning goal.”</p> <p><b>Display Slide 18.</b> A Main Learning Goal Is NOT ... (1 min)</p> <p>a. Review what is <b>not</b> considered a main learning goal.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p style="background-color: #d3d3d3; margin: 0; padding: 2px;">Definitions: One Main Learning Goal and Science Ideas</p> <p style="color: #c00000; margin: 0; padding: 2px;">Definitions: One Main Learning Goal and Science Ideas</p> <ol style="list-style-type: none"> <li>1. Read these sections in the STeLLA strategies booklet: (1) STeLLA Strategy A: Identify One Main Learning Goal, and (2) Student Ideas and Science Ideas Defined.</li> <li>2. Based on these readings, what are the differences between a main learning goal and a science idea?</li> </ol>	<p><b>Display Slide 19.</b> Definitions: One Main Learning Goal and Science Ideas (10 min)</p> <ol style="list-style-type: none"> <li>a. Have participants locate these two readings in the strategies booklet: (1) STeLLA Strategy A: Identify One Main Learning Goal, and (2) Student Ideas and Science Ideas Defined.</li> <li>b. “After you read these sections in the strategies booklet, we’ll discuss the differences between a science idea and a main learning goal.”</li> <li>c. <b>Individuals (3 min):</b> Give participants time to read the specified sections in the strategies booklet.</li> <li>d. <b>Whole group (7 min):</b> Discuss the question on the slide.</li> <li>e. <b>Emphasize:</b> “While you might incorporate several science ideas that support the main learning goal of a lesson, be careful not to plan an ‘all about’ lesson with too many different science ideas that will likely come across to students as a bunch of disconnected facts to be memorized.”</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p><b>Practice Identifying Student Ideas and Science Ideas</b></p> <p>Identify any student ideas and science ideas in this list:</p> <ol style="list-style-type: none"> <li>1. Erosion and deposition</li> <li>2. Water dissolves soil and rock, and they disappear.</li> <li>3. Water carries rock and soil from one place to another.</li> <li>4. Erosion happens at different rates depending on the type of material and the force necessary to move it.</li> <li>5. Rocks are really hard, so they don't change.</li> <li>6. Trees are landforms too, because they're part of the land.</li> <li>7. Mountains, hills, lakes, and rivers</li> </ol>	<p><b>Display Slide 20.</b> Practice Identifying Student Ideas and Science Ideas (5 min)</p> <p>a. “Next, we’ll practice identifying student ideas and science ideas just to make sure you understand the way we’re defining these terms.”</p> <p><b>Note:</b> As needed, refer participants to the section in the strategies booklet where student ideas are defined (Student Ideas and Science Ideas Defined).</p> <p>b. <b>Individuals:</b> “First, identify examples of <b>science ideas</b> on the slide. If you need help, refer to the document in your lesson plans binders titled Common Student Ideas about about Earth’s Changing Surface. Then identify examples of <b>student ideas</b> on the slide.”</p> <p>c. <b>Whole group:</b> Discuss participants’ responses and the correct answers (see answer key).</p> <p><b>Answer key:</b></p> <ul style="list-style-type: none"> <li>• Science ideas: 3, 4</li> <li>• Student ideas: 2, 5, 6</li> </ul>
		<p><b>Practice Identifying Student Ideas and Science Ideas in a Class Discussion</b></p> <p>Identify <b>one student idea</b> and <b>one science idea</b> in this class discussion:</p> <p><b>T:</b> What do you think is happening to the stream-table model?</p> <p><b>S1:</b> It’s getting wet.</p> <p><b>S2:</b> The water is moving the sand, so that means the river can make a canyon.</p> <p><b>S3:</b> The water is dissolving the sand, and it’s disappearing.</p> <p><b>T:</b> Is the sand really disappearing? What about here ? <i>[Point to the end of the stream table.]</i> What do you see?</p> <p><b>S3:</b> Sand. So it isn’t dissolving.</p> <p><b>S2:</b> The water is just moving it.</p>	<p><b>Display Slide 21.</b> Practice Identifying Student Ideas and Science Ideas in a Class Discussion (5 min)</p> <p>a. “It’s a little trickier to recognize student ideas and science ideas in class discussions because students sometimes give only one- or two-word answers to teacher questions. But if you link the teacher’s question with a student’s response, you can sometimes find a</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>science idea or a student idea.”</p> <p><b>Note:</b> In the RESPeCT PD program, we encourage students to speak in complete sentences as much as possible.</p> <p>b. “Let’s practice linking the teacher’s questions with student responses in the sample discussion on the slide.”</p> <p>c. <b>Pairs:</b> “Work with a partner to see if you can identify one student idea and one science idea in this discussion.”</p> <p>d. <b>Whole-group share-out:</b> Have participants share the ideas they identified in the sample discussion. Then review the answers (see answer key below).</p> <p>e. <b>Emphasize:</b> “Here’s some food for thought: To make student thinking more visible, why not require students to speak in complete sentences during classroom discussions about science ideas?”</p> <p><b>Answer key:</b></p> <ul style="list-style-type: none"> <li>• <i>Student ideas/misconceptions:</i> <ul style="list-style-type: none"> <li>• “Water is dissolving the sand, and it’s disappearing.”</li> </ul> </li> <li>• <i>Science ideas:</i> <ul style="list-style-type: none"> <li>• Water is moving the sand.</li> <li>• Water [the river] is forming a canyon.</li> </ul> </li> </ul>



PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p><b>Science Ideas That Support the Main Learning Goal</b></p> <p><b>Main learning goal:</b> Water changes the land.</p> <p><b>Supporting ideas:</b></p> <ul style="list-style-type: none"> <li>• Water can break down rock.</li> <li>• Water can carry soil and rocks of all shapes and sizes.</li> <li>• Water can carry rocks and soil from one place to another.</li> <li>• Water deposits soil and rock in places like deltas.</li> </ul>	<p><b>Display Slide 22.</b> Science Ideas That Support the Main Learning Goal (6 min)</p> <p>a. Display <i>only</i> the main learning goal on the slide.</p> <p>b. <b>Pairs:</b> “Work with a partner to come up with two or three science ideas that might support the development of this main learning goal. Use the Earth’s Changing Surface Content Background Document and the Common Student Ideas chart as resources.”</p> <p>c. <b>Whole group:</b> Have pairs share the supporting science ideas they came up with.</p> <p>d. Next, reveal the list of possible supporting science ideas one by one on the slide and compare them with participants’ ideas.</p> <p>e. <b>Highlight:</b> “Some of these supporting science ideas could also be a main learning goal for a lesson.”</p>
		<p><b>Practice Identifying Main Learning Goals</b></p> <ol style="list-style-type: none"> <li>1. <b>Small groups or pairs:</b> Use the criteria in Analysis Guide A (handout 5.1 in binder) to analyze a list of candidate main learning goals related to Earth’s changing surface (handout 5.2: Practice Identifying One Main Learning Goal).</li> <li>2. Select candidates from the list that you think are good main learning goals for the focus of the lesson and record the reasons for your choices on handout 5.2.</li> <li>3. <b>Whole group:</b> Discuss and justify your selections.</li> </ol>	<p><b>Display Slide 23.</b> Practice Identifying Main Learning Goals (10 min)</p> <p>a. Direct participants to locate handout 5.1 (Analysis Guide A: Identifying One Main Learning Goal) and handout 5.2 (Practice Identifying One Main Learning Goal) in their PD program binders.</p> <p>b. <b>Small groups/pairs:</b> Have participants form small groups or pairs and use the criteria from Analysis Guide A to analyze the list of possible learning goals on handout 5.2.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>c. Direct participants to write yes or no on the handout to indicate whether the statement is or is not a good candidate for a lesson’s main learning goal. Then have them state the reason for each assessment using criteria from the analysis guide.</p> <p>d. <b>Whole-group share-out:</b> Have participants share and discuss their selections.</p> <p>e. Be sure to highlight what distinguishes a main learning goal from supporting science ideas, topics, phrases, activities, or questions.</p> <p>f. Also use this discussion to clarify science content.</p> <p><b>Note:</b> For answers, see PD Leader Master: Practice Identifying One Main Learning Goal (Answer Key).</p>
10:00–10:10 10 min	<b>BREAK</b>		
10:10–12:00 110 min  <b>Lesson Analysis: SCSL Strategy A</b>  Slides 24–32	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>Use lesson analysis of classroom videos to better understand SCSL strategy A.</li> <li>Deepen participants’ science-content knowledge of Earth’s changing surface through lesson analysis.</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>Using one main learning goal brings coherence within and across lessons.</li> <li>A main learning goal is a big idea</li> </ul>	<p style="background-color: #cccccc; padding: 2px;"><b>Lesson Analysis: Strategy A</b></p> <p>Next we’ll watch a sequence of three video clips from a single lesson on Earth’s changing surface.</p> <p><b>Analysis question for all three clips:</b> Does this lesson have one main learning goal?</p> <p><b>Follow-up questions:</b></p> <ul style="list-style-type: none"> <li>If yes, what is it?</li> <li>If no, what do you think is happening in the lesson?</li> </ul>	<p><b>Display Slide 24.</b> Lesson Analysis: Strategy A (1 min)</p> <p>a. Make sure participants understand that they will be viewing a sequence of three video clips from the same lesson on Earth’s changing surface.</p> <p>b. “For all three clips, we’ll answer the analysis question, <i>Does this lesson have one main learning goal?</i>”</p> <p>c. “If the answer is yes, what is the learning goal? If no, why do you think that’s the case? What do you think is happening in the</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	<p>that students are expected to learn and take away from a lesson or series of lessons. Everything in the lesson supports the development of this one main learning goal.</p> <p><b>What Participants Do</b></p> <ul style="list-style-type: none"> <li>• Watch a sequence of three video clips from one lesson. Analyze the science ideas in each clip and determine whether they're organized to support one main learning goal.</li> <li>• Use the criteria in Analysis Guide A to determine the quality of the main learning goal identified for this lesson.</li> <li>• Examine a lesson plan from the ECS unit to see how the main learning goal and supporting science ideas are identified.</li> </ul> <p><b>Videos</b></p> <ul style="list-style-type: none"> <li>• Video Clip 5.1, Poulsen classroom (beginning of lesson)</li> <li>• Video Clip 5.2, Poulsen classroom (during the lesson)</li> <li>• Video Clip 5.3, Poulsen classroom (end of lesson)</li> </ul> <p><b>Handouts in PD Binder</b></p> <ul style="list-style-type: none"> <li>• 5.1 Analysis Guide A</li> <li>• 5.3 Transcript for Video Clip 5.1</li> <li>• 5.4 Transcript for Video Clip 5.2</li> <li>• 5.5 Transcript for Video Clip 5.3</li> </ul> <p><b>Supplies</b></p>	<p style="text-align: center;"><b>Slides</b></p> <hr/> <p><b>Lesson Analysis: Review Lesson Context, Video Clip 1</b></p> <ol style="list-style-type: none"> <li>1. Read the lesson context on the video transcript (handout 5.3 in PD program binder).</li> <li>2. As you watch the clip, keep the analysis question in mind: <b>Does this lesson have one main learning goal?</b> <ul style="list-style-type: none"> <li>• If yes, what is it?</li> <li>• If no, what do you think is happening in the lesson? <a href="#">Link to video clip 1: 5.1_msppc_gr2_ecs_poulsen_L5_c2</a></li> </ul> </li> </ol> <hr/> <p><b>Lesson Analysis: Analyze the Video, Video Clip 1</b></p> <ol style="list-style-type: none"> <li>1. Study the video transcript and write down any science ideas the students and/or the teacher put on the table.</li> <li>2. Pair up and compare the science ideas you identified. Then discuss the analysis question: <b>Does this lesson have one main learning goal?</b> <ul style="list-style-type: none"> <li>• If yes, what is it?</li> <li>• If no, what do you think is happening in the lesson?</li> </ul> </li> <li>3. As a group, discuss what the main learning goal might be. Support your answers using your analysis of the science ideas you identified.</li> </ol>	<p>lesson?"</p> <p><b>Display Slide 25.</b> Lesson Analysis: <b>Review</b> Lesson Context, Video Clip 1 (5 min)</p> <ol style="list-style-type: none"> <li>a. Have participants read the lesson context at the top of the video transcript (handout 5.3 in PD program binder). (Less than 1 min)</li> <li>b. Read the information on the slide. (Less than 1 min)</li> <li>c. Show the video clip. (4 min)</li> </ol> <hr/> <p><b>Display Slide 26.</b> Lesson Analysis: <b>Analyze</b> the Video, Video Clip 1 (25 min)</p> <ol style="list-style-type: none"> <li>a. Before participants analyze the video transcript, remind them of these key points: (1 min) <ul style="list-style-type: none"> <li>• A science idea is a full-sentence idea that students could take away as something they learned during the lesson.</li> <li>• Science ideas are sometimes identified by linking the teacher's question with the student's response.</li> </ul> </li> <li>b. <b>Individuals (8 min):</b> "Study the video transcript and write in your notebooks any science ideas you identify in the discussion."</li> <li>c. <b>Pairs (5 min):</b> "Pair up and compare the science ideas you identified in the transcript. Then discuss the questions on the slide."</li> <li>d. <b>Whole group (11 min):</b> Have participants share what they think might be the main</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	<ul style="list-style-type: none"> <li>Science notebooks</li> <li>Chart paper and markers</li> </ul> <p><b>PD Resources</b></p> <ul style="list-style-type: none"> <li>RESPeCT lesson plans binder</li> </ul>	<div style="background-color: #cccccc; height: 15px; margin-bottom: 5px;"></div> <p><b>Lesson Analysis: Review Lesson Context, Video Clip 2</b></p> <ol style="list-style-type: none"> <li>Read the lesson context on the video transcript (handout 5.4 in PD binder).</li> <li>As you watch the clip, keep the analysis question in mind: <b>Does this lesson have one main learning goal?</b> <ul style="list-style-type: none"> <li>If yes, what is it?</li> <li>If no, what do you think is happening in the lesson?</li> </ul> </li> </ol> <p><a href="#">Link to video clip 2: 5.2_mspcp_gr2_ecs_poulsen_L5_c3</a></p>	<p>learning goal of this lesson, using their analyses of the science ideas they identified to support their suggestions.</p> <ol style="list-style-type: none"> <li>List the possible learning goals on chart paper.</li> <li>Let participants know they'll revisit this list of possible main learning goals for the lesson after they watch the remaining video clips.</li> </ol> <p><b>Examples of science ideas:</b></p> <ul style="list-style-type: none"> <li>Water can change the land.</li> <li>Water can carry rocks and dirt from one place to another.</li> <li>Water is strong and powerful.</li> <li>Water carries rocks and dirt from the Grand Canyon to Lake Mead.</li> </ul> <p><b>Implied main learning goal:</b></p> <ul style="list-style-type: none"> <li>Water changes the land by moving rock and soil from one place to another.</li> </ul> <p><b>Display Slide 27.</b> Lesson Analysis: <b>Review</b> Lesson Context, Video Clip 2 (5 min)</p> <ol style="list-style-type: none"> <li>Have participants read the lesson context at the top of the video transcript (handout 5.4 in PD binder). (Less than 1 min)</li> <li>Review the instructions on the slide. (Less than 1 min)</li> <li>Show the video clip. (4 min)</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p style="background-color: #d3d3d3; padding: 2px;">Lesson Analysis: <b>Analyze the Video, Video Clip 2</b></p> <ol style="list-style-type: none"> <li>1. Study the video transcript and write down any <b>student ideas</b> and <b>science ideas</b> you identify.</li> <li>2. Pair up and compare the student ideas and science ideas you identified. Then discuss this question: <b>Are these ideas consistent with the possible main learning goal you identified for video clip 1?</b></li> <li>3. As a group, discuss the possible main learning goal for this lesson. Make sure to support your answers using your analysis of the science ideas you identified.</li> </ol>	<p><b>Display Slide 28.</b> Lesson Analysis: <b>Analyze the Video, Video Clip 2</b> (25 min)</p> <ol style="list-style-type: none"> <li>a. Review the definitions of a science idea and a student idea. Remind participants that students can express correct science ideas and inaccurate student ideas at the same time. (1 min)</li> <li>b. <b>Individuals (8 min):</b> “Study the video transcript and write in your notebooks any student ideas and science ideas you identify.”</li> <li>c. <b>Pairs (5 min):</b> “Pair up and compare the student ideas and science ideas you identified in the transcript. Then discuss the question on the slide.”</li> <li>d. <b>Whole group (11 min):</b> Have participants share what they think might be the main learning goal of this lesson, using their analyses of the science ideas they identified to support their suggestions.</li> <li>e. List the possible learning goals on chart paper.</li> <li>f. Let participants know they’ll revisit this list of possible main learning goals for the lesson after they watch one more video clip.</li> </ol> <p><b>Examples of student ideas:</b></p> <ul style="list-style-type: none"> <li>• <b>Video segments 00:02:13–02:37:</b> The student observes that rocks and soil “got lower” as a result of the water flowing over the model. This might be an accurate science idea if <i>lower</i> means “downstream.”</li> <li>• <b>Segments 00:05:12–05:22:</b> The student observes that the soil and rocks are “disappearing” into the water.</li> </ul>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="877 857 1285 915"><b>Lesson Analysis: Review Lesson Context, Video Clip 3</b></p> <ol data-bbox="877 927 1285 1141" style="list-style-type: none"> <li>1. Read the lesson context on the video transcript (handout 5.5 in PD binder).</li> <li>2. As you watch the clip, keep the analysis question in mind: <b>Does this lesson have one main learning goal?</b> <ul data-bbox="892 1068 1285 1141" style="list-style-type: none"> <li>• If yes, what is it?</li> <li>• If no, what do you think is happening in the lesson?</li> </ul> </li> </ol> <p data-bbox="1014 1149 1285 1166"><a href="#">Link to video clip 3: 5.3 stella_fw_belcastro_L1_c3</a></p>	<p data-bbox="1335 261 1682 285"><b>Examples of science ideas:</b></p> <ul data-bbox="1335 293 1906 565" style="list-style-type: none"> <li>• Water can change the land.</li> <li>• Water from rain and rivers can form lakes and rivers and canyons.</li> <li>• Water makes the land muddy.</li> <li>• The shape of a river can change (zigzag).</li> <li>• Rivers can flow into places they haven't been before.</li> <li>• Water can move rocks and soil, making them go "lower" [downstream?].</li> </ul> <p data-bbox="1335 581 1682 605"><b>Implied main learning goal:</b></p> <ul data-bbox="1335 613 1906 699" style="list-style-type: none"> <li>• Water changes the land by creating lakes, rivers, and canyons and by moving rocks and soil.</li> </ul> <p data-bbox="1335 829 1864 888"><b>Display Slide 29.</b> Lesson Analysis: <b>Review</b> Lesson Context, Video Clip 3 (5 min)</p> <ol data-bbox="1335 938 1896 1149" style="list-style-type: none"> <li>a. Have participants read the lesson context at the top of the video transcript (handout 5.5 in PD binder). (Less than 1 min)</li> <li>b. Review the instructions on the slide. (Less than 1 min)</li> <li>c. Show the video clip. (4 min)</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p style="background-color: #d3d3d3; padding: 2px;">Lesson Analysis: <b>Analyze the Video, Video Clip 3</b></p> <ol style="list-style-type: none"> <li>1. Study the video transcript and write down any <b>student ideas</b> and <b>science ideas</b> you identify.</li> <li>2. Pair up and compare the student ideas and science ideas you identified. Then discuss this question: <b>Are these ideas consistent with the possible main learning goal you identified for clips 1 and 2?</b></li> <li>3. As a group, discuss the possible main learning goal for this lesson. Make sure to support your answers using your analysis of the science ideas you identified.</li> </ol>	<p><b>Display Slide 30.</b> Lesson Analysis: <b>Analyze the Video, Video Clip 3</b> (24 min)</p> <ol style="list-style-type: none"> <li>a. <b>Individuals (8 min):</b> “Study the video transcript and write in your notebooks any student ideas and science ideas you identify.”</li> <li>b. <b>Pairs (5 min):</b> “Pair up and compare the student ideas and science ideas you identified on the transcript. Then discuss the questions on the slide.”</li> <li>c. <b>Whole group (11 min):</b> Have participants share what they think might be the main learning goal of this lesson, using their analyses of the science ideas they identified to support their suggestions.</li> <li>d. List the science ideas and possible learning goals on chart paper.</li> <li>e. <b>Ask:</b> “Did the three video clips develop coherence across the lesson or include too many ideas that didn’t support the main learning goal?”</li> </ol> <p><b>Examples of science ideas:</b></p> <ul style="list-style-type: none"> <li>• Water changes the land.</li> <li>• Water turns dirt to mud and breaks down rocks.</li> <li>• Fast water in rivers is very powerful.</li> <li>• Water from rivers can break down some of the Grand Canyon.</li> <li>• Water can move rocks and soil from one place to another, which causes the land to change over time.</li> <li>• A model can show what happens in the real world.</li> </ul> <p><b>Implied main learning goal:</b></p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="840 755 1113 779"><b>One Main Learning Goal?</b></p> <ol data-bbox="840 803 1260 1015" style="list-style-type: none"> <li>1. Based on your analysis of the three video clips, does this lesson have one main learning goal? What do you think it is?</li> <li>2. Use the criteria questions in Analysis Guide A to analyze the main learning goal identified in these clips.</li> <li>3. Are there any supporting science ideas that don't closely match the main learning goal?</li> </ol>	<ul data-bbox="1333 243 1911 682" style="list-style-type: none"> <li>• Water can move rock and soil from one place to another, which causes the land to change over time.</li> </ul> <p data-bbox="1333 349 1911 406"><b>Ideas consistent with implied MLGs in clips 1 and 2? Yes.</b></p> <ul data-bbox="1375 414 1911 682" style="list-style-type: none"> <li>• <b>MLG in clip 1:</b> Water changes the land by moving rocks and soil from one place to another.</li> <li>• <b>MLG in clip 2:</b> Water changes the land by creating lakes, rivers, and canyons and by moving rocks and soil.</li> <li>• <b>MLG in clip 3:</b> Water can move rocks and soil from one place to another, which causes the land to change over time.</li> </ul> <p data-bbox="1333 722 1911 779"><b>Display Slide 31.</b> One Main Learning Goal? (15 min)</p> <ol data-bbox="1333 828 1911 1331" style="list-style-type: none"> <li>a. <b>Whole group:</b> Discuss the first question on the slide and reach a consensus on the main learning goal for the lesson. <b>Ideal response:</b> <i>Water can change the land by moving rocks and soil from one place to another.</i></li> <li>b. <b>Pairs:</b> Have participants work in pairs to answer the criteria questions in Analysis Guide A for the main learning goal they agreed upon for this lesson. Also have them identify any supporting science ideas that don't closely match the main learning goal.</li> <li>c. <b>Whole group:</b> Discuss participants' responses to the questions in Analysis Guide A and the final question on the slide.</li> </ol> <p data-bbox="1333 1356 1911 1404"><b>Ideal responses to questions on the slide:</b></p> <ul data-bbox="1333 1380 1911 1404" style="list-style-type: none"> <li>• <b>One main learning goal?</b> Yes. The MLGs for</li> </ul>



PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>all three clips are closely aligned to the learning goal of the lesson: <i>Water can change the land by moving rocks and soil from one place to another.</i></p> <p><b>Note:</b> The actual learning goal for this lesson is <i>Water can change landforms over time.</i> The issue of time doesn't seem to be addressed in clips 1 and 2, and the teacher only briefly mentions it in a summary statement in clip 3.</p> <p><b>Ideal responses to questions in Analysis Guide A:</b></p> <ul style="list-style-type: none"> <li>• <b>Question 1:</b> Yes, the MLG is stated in a full sentence and represents a big science idea students can take away at the end of the lesson.</li> <li>• <b>Question 2:</b> Students may already know the science content reflected in the learning goal. There is some evidence in clip 1 that the idea of water moving rocks and soil was addressed in a previous lesson. However, it isn't clear that all students understand this idea.</li> <li>• <b>Question 3:</b> Yes, the MLG is an important science idea worthy of 40 minutes of instruction time.</li> <li>• <b>Question 4:</b> Yes, students have misconceptions or confusion about the science ideas. In clip 1, students don't seem certain that water can move rocks (segments 00:00:26; 00:00:32).</li> <li>• <b>Question 5:</b> Yes, the main learning goal challenges student thinking and misconceptions.</li> <li>• <b>Questions 6 and 7:</b> Yes, the learning goal is grade-level appropriate and scientifically accurate.</li> </ul>


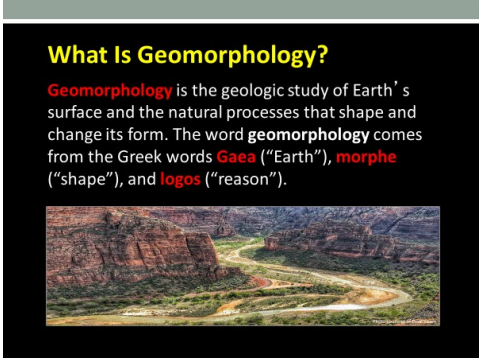
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p style="background-color: #d3d3d3; margin: 0; padding: 2px;"><b>Examine Earth's Changing Surface: Lesson 2</b></p> <ol style="list-style-type: none"> <li>1. Locate the scope and sequence chart for the ECS lessons (lesson plans binder, pretabs section).</li> <li>2. Examine the main learning goals for lessons 2a and 2b. Then read the supporting science ideas in the Science Content Storyline column.</li> <li>3. What two patterns do students identify in these lessons?</li> <li>4. Keep these patterns in mind as the storyline develops in the lesson sequence.</li> </ol>	<p><b>Display Slide 32.</b> Examine Earth's Changing Surface: Lesson 2 (5 min)</p> <p><b>Note:</b> This slide is <b>optional</b> if time is running short. It's designed to help participants see how the lesson plans are written to highlight the main learning goal and science ideas that support the main learning goal.</p> <ol style="list-style-type: none"> <li>a. Have participants examine the main learning goals for ECS lessons 2a and 2b in the scope and sequence chart of their lesson plans binders. Then have them review the supporting science ideas in the Science Content Storyline column.</li> <li>b. <b>Ask:</b> "What two patterns do students identify in these lessons?"</li> <li>c. Encourage participants to keep the identified patterns in mind throughout the lesson sequence.</li> </ol> <p><b>Ideal responses:</b></p> <ul style="list-style-type: none"> <li>• The main learning goals for lessons 2a and 2b emphasize that the land looks different in different places. Students identify the following two patterns: <ol style="list-style-type: none"> <li>1. In some places, the land rises high above Earth's surface, and in other places, the land cuts deep into the surface.</li> <li>2. Some places on Earth's surface are flat, while other places have bodies of water.</li> </ol> </li> </ul>
12:00–12:45 45 min	<b>LUNCH</b>		

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
<p>12:45–3:10 145 min (Includes 10-min break)</p> <p><b>Content Deepening: Earth’s Changing Surface</b></p> <p>Slides 33–69</p>	<p><b>Purpose:</b></p> <ul style="list-style-type: none"> <li>• Deepen participants’ understandings of the science content that is part of the Earth’s Changing Surface lesson series.</li> <li>• Deepen participants’ science-content knowledge by conducting investigations from ECS lessons 1a/b and 2a/b.</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>• Earth’s surface has many different natural features called <i>landforms</i>.</li> <li>• Landforms are made out of the land and include mountains, hills, plateaus, plains, valleys, and canyons. Bodies of water, such as rivers and lakes, are also landforms because they’re natural features of Earth’s surface.</li> <li>• Landforms don’t include human-made structures, such as buildings and roads, or living things that grow on the land, such as trees and plants.</li> <li>• Landforms on Earth’s surface look different in different places. Some landforms rise high above the surface, some are flat, and some cut deep into the surface. Some places have many bodies of water, and others don’t.</li> </ul>	<div data-bbox="835 256 1306 626"> </div> <div data-bbox="835 639 1306 1341"> </div>	<p><b>Display Slide 33.</b> Content Deepening: Earth’s Changing Surface (Less than 1 min)</p> <p>a. “Now let’s begin our investigation of Earth’s changing surface.”</p> <p><b>Note:</b> Throughout this content deepening phase, refer as needed to Earth’s Changing Surface Content Background Document and Common Student Ideas about Earth’s Changing Surface.</p> <p><b>Display Slide 34.</b> Unit Central Questions (Less than 1 min)</p> <p>a. Read the unit central questions on the slide.</p> <p><b>Note:</b> Alternatively, have participants locate lesson 1a in their lesson plans binders and read the unit central questions on the overview page.</p> <p>b. Emphasize that these questions will guide student learning throughout the entire ECS unit.</p> <p>c. Tell participants that the information they gather during the content deepening investigations this week will help them answer these questions.</p> <p>d. Have participants write these questions in their science notebooks and draw a double-lined box around them. This practice reinforces the process they’ll follow with students in the lessons.</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	<p><b>What Participants Do</b></p> <ul style="list-style-type: none"> <li>• Conduct activities from ECS lessons 1a/b and 2a/b.</li> <li>• Explore and discuss key science ideas behind the ECS lessons.</li> <li>• Identify and describe different natural landforms on Earth's surface and distinguish them from human-made structures and living things on the surface.</li> <li>• Build models of different landforms out of sand.</li> <li>• Use relief maps and Venn diagrams to observe and compare similarities and differences among landforms in different locations.</li> <li>• Develop claims about landforms in different places using evidence gathered from today's investigations.</li> </ul> <p><b>Handouts in PD Program Binder</b></p> <ul style="list-style-type: none"> <li>• 5.6 Landform Picture Cards (from lessons 1a/b)</li> <li>• 5.7 Landform Labels (4 labels per group corresponding to picture cards)</li> </ul> <p><b>Handouts in Lesson Plans Binder</b></p> <ul style="list-style-type: none"> <li>• 2.1 Land Detectives (from ECS lesson 2a)</li> <li>• 2.4 Land Detectives (from ECS lesson 2b)</li> </ul>	<div data-bbox="835 256 1312 764"> <p><b>Content Deepening Focus Questions</b></p> <ul style="list-style-type: none"> <li>• What does the surface of Earth look like?</li> <li>• How can we make models out of sand to show the shapes of different landforms?</li> <li>• How does the land on Earth's surface look different in different places?</li> </ul> </div> <div data-bbox="835 776 1312 1138"> </div>	<p><b>Display Slide 35.</b> Content Deepening Focus Questions (Less than 1 min)</p> <p>a. Review the content deepening focus questions on the slide.</p> <p><b>Display Slide 36.</b> Today's Content Deepening (Less than 1 min)</p> <p>a. "Today's content deepening work will focus on science ideas about Earth's changing surface from ECS lessons 1 and 2."</p>

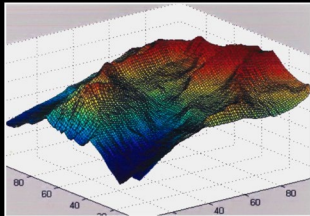
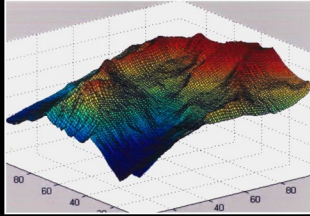
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	<p><b>Supplies</b></p> <ul style="list-style-type: none"> <li>• Science notebooks</li> <li>• Chart paper and markers</li> <li>• Blue plastic tablecloths (1 per group)</li> <li>• Trays of dampened play sand (4 trays per group)</li> <li>• Plastic relief map of the United States (1 per group)</li> </ul> <p><b>PD Resources</b></p> <ul style="list-style-type: none"> <li>• RESPeCT lesson plans binder</li> </ul> <p><b>Resources in Lesson Plans Binder</b></p> <ul style="list-style-type: none"> <li>• Content background document</li> <li>• Common Student Ideas</li> </ul>	<p><b>How We Think about Landscapes and Landforms</b></p> <ol style="list-style-type: none"> <li>1. How would you describe the landscape of your home area?</li> <li>2. What is your favorite kind of natural landscape on Earth? Why?</li> <li>3. Share a story about visiting a place like this. What was it like?</li> </ol>	<p><b>Display Slide 37.</b> How We Think about Landscapes and Landforms (20 min)</p> <ol style="list-style-type: none"> <li>a. Read the three questions on the slide.</li> <li>b. <b>Individuals (5 min):</b> “Briefly answer these questions in your science notebooks.”</li> <li>c. <b>Whole-group share-out (10 min):</b> In a round-robin, call on participants to share their answers to the questions. During this share-out, record participants’ descriptions on chart paper. You may want to list nouns in one column and adjectives in another column.</li> <li>d. Following the share-out, briefly summarize some key descriptions, focusing on the diversity of landscapes (e.g., flat urban landscape; rural farm; high, snowy mountains; tropical beach at sunset). Also highlight words participants used for landscapes, landforms, and topographic shapes. Then ask participants the following questions and add key ideas to the chart: <ul style="list-style-type: none"> <li>• What is the difference between landscapes and landforms?</li> <li>• What landforms did we include in our personal stories?</li> <li>• What were some good examples of description language we used to describe these landforms?</li> <li>• What other words could we use to describe landscapes, landforms, and topographic shapes?</li> <li>• Do you think that 2nd graders will be able to describe landscapes and landforms in this way? What difficulties might they have?</li> </ul> </li> </ol>


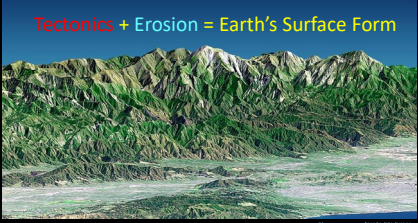
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p><b>Examples of descriptive terminology:</b></p> <ol style="list-style-type: none"> <li>1. Landscapes <ul style="list-style-type: none"> <li>• Mountains</li> <li>• Deserts</li> <li>• Coastlines</li> <li>• Cities</li> </ul> </li> <li>2. Landforms <ul style="list-style-type: none"> <li>• Peaks</li> <li>• Ridges</li> <li>• Hills</li> <li>• Valleys</li> <li>• Canyons</li> <li>• Gullies</li> <li>• Plains</li> <li>• Prairies</li> <li>• Plateaus</li> <li>• Coastlines</li> <li>• Shores</li> <li>• Cliff</li> <li>• Beaches</li> <li>• Headlands</li> <li>• Deltas</li> <li>• Islands</li> <li>• Lakes</li> <li>• Ponds</li> <li>• Rivers</li> <li>• Streams</li> </ul> </li> <li>3. Topographic shapes <ul style="list-style-type: none"> <li>• Steep</li> <li>• Sloping</li> <li>• Gentle</li> <li>• Flat</li> <li>• Rough</li> <li>• Rugged</li> <li>• Jagged</li> <li>• Abrupt</li> <li>• Smooth</li> </ul> </li> </ol>

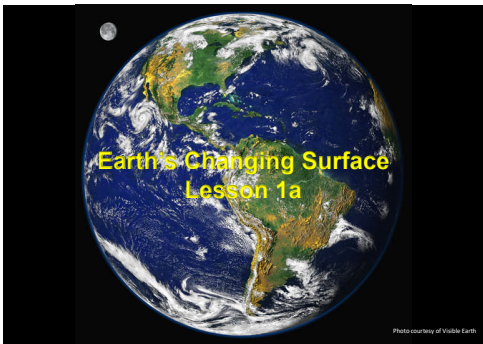
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<ul style="list-style-type: none"> <li>• Low</li> <li>• High</li> </ul>
			<p><b>Display Slide 38.</b> What Is Geomorphology? (Less than 1 min)</p> <p>a. “Let’s spend a few minutes exploring some key science ideas related to Earth’s changing surface. The first idea we’ll learn about is geomorphology.”</p>
			<p><b>Display Slide 39.</b> What Is Geomorphology? (Less than 1 min)</p> <p>a. Read the definition on the slide and explain that the word <i>geomorphology</i> is derived from the three Greek words: <i>Gaea</i>, which means “Earth,” <i>morphe</i>, which means “shape,” and <i>logos</i>, which means “reason.”</p>



PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p><b>Display Slide 40.</b> What Is Topography? (Less than 1 min)</p> <ol style="list-style-type: none"> <li>Explain to participants that the term <i>topography</i> refers to the shape of Earth's surface.</li> <li>"This image shows the dramatic topographic relief of the Sierra Nevada Mountains, with Mount Whitney towering more than 14,000 feet above sea level, and the adjacent Owens Valley reaching only 4,000 feet in elevation."</li> </ol>
			<p><b>Display Slide 41.</b> Topography: The Shape of Earth's Surface (Less than 1 min)</p> <ol style="list-style-type: none"> <li>Emphasize that topography is the result of competing natural processes that build up and wear down Earth's surface at the same time. <i>Tectonics</i> is a process that builds up Earth's surface, and <i>erosion</i> is a process that wears it down.</li> </ol>




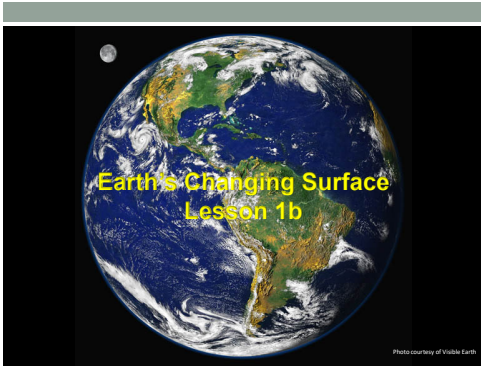
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="877 293 1285 318"><b>Topography: The Shape of Earth's Surface</b></p>  <p data-bbox="926 558 1230 602">Earth's surface is a 3-D grid of points. (x = Easting, y = Northing, z = Elevation)</p>	<p data-bbox="1335 258 1885 318"><b>Display Slide 42.</b> Topography: The Shape of Earth's Surface (Less than 1 min)</p> <p data-bbox="1335 370 1898 607">a. "A geomorphologist thinks of Earth's surface as a 3-D grid or net of points. Each point is defined by its x, y, and z coordinates. The x coordinate describes the distance east and west, the y coordinate describes the distance north and south, and the z coordinate describes elevation or the distance up and down."</p>
		<p data-bbox="877 821 1285 846"><b>Topography: The Shape of Earth's Surface</b></p>  <p data-bbox="877 1086 1276 1130">The elevation (z) of any point can change over time by building up or wearing down.</p>	<p data-bbox="1335 786 1885 846"><b>Display Slide 43.</b> Topography: The Shape of Earth's Surface (Less than 1 min)</p> <p data-bbox="1335 898 1906 1013">a. "Over time, the elevation or z coordinate of any point can change by either building up from tectonic processes or wearing down from erosional processes."</p>



PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<div data-bbox="835 256 1312 618"> <p><b>Topography: The Shape of Earth's Surface</b></p> <p>San Gabriel Mountains Southern California</p>  <p><small>Photo courtesy of NASA/JPL/NASA</small></p> <p>The surface of Earth is continually changing, and the landscapes we see around us are only snapshots.</p> </div>	<p><b>Display Slide 44.</b> Topography: The Shape of Earth's Surface (Less than 1 min)</p> <ol style="list-style-type: none"> <li>“This slide shows a digital elevation model of the San Gabriel Mountains rising above the Pomona Valley. Mount Baldy (also known as Mount San Antonio) towers more than 10,000 feet above sea level.”</li> <li>“The surface of Earth is continually changing, or evolving, and the landscapes we see around us are only momentary snapshots or freeze-frames in a full-length movie.”</li> </ol>
		<div data-bbox="835 824 1312 1187"> <p><b>Earth's Changing Surface</b></p> <p>Tectonics + Erosion = Earth's Surface Form</p>  <p><small>Photo courtesy of NASA/JPL/NASA</small></p> <p>The surface of Earth is continually changing, and the landscapes we see around us are only snapshots.</p> </div>	<p><b>Display Slide 45.</b> Earth's Changing Surface (Less than 1 min)</p> <ol style="list-style-type: none"> <li>“Earth's surface form is the result of tectonic processes that build up the land and erosional processes that wear down the land at the same time.”</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p><b>Display Slide 46.</b> Earth's Changing Surface: Lesson 1a (Less than 1 min)</p> <p>a. "Next, we'll explore science ideas about Earth's changing surface from ECS lesson 1a."</p>
		<p><b>Content Deepening: Focus Question 1</b></p> <p>What does the surface of Earth look like?</p>	<p><b>Display Slide 47.</b> Content Deepening: Focus Question 1 (Less than 1 min)</p> <p>a. Read the focus question on the slide.</p> <p>b. Emphasize that this question will guide student learning throughout ECS lesson 1a.</p> <p>c. Have participants write the question in their science notebooks and draw a box around it.</p>


PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="869 285 1167 310">Describe the Surface of Earth</p> 	<p data-bbox="1335 258 1850 318"><b>Display Slide 48.</b> Describe the Surface of Earth (8 min)</p> <p data-bbox="1335 370 1902 430">a. “How would you describe the surface of Earth in each of these photos?”</p> <p data-bbox="1335 444 1902 565">b. <b>Turn and Talk:</b> “Discuss this question with an elbow partner and develop an answer using descriptive terminology for the landforms and their shape.”</p> <p data-bbox="1335 579 1902 850">c. <b>Whole-group share-out:</b> Invite participants to share their descriptions with the group. Probe their responses (e.g., “Can you say more about that?”) and elicit differing points of view (e.g., “Does everyone agree with that observation?”). Accept all responses at this point, but note whether participants are describing landforms or living things on Earth’s surface.</p>
		<p data-bbox="863 919 1161 943">Describe the Surface of Earth</p> 	<p data-bbox="1335 891 1850 951"><b>Display Slide 49.</b> Describe the Surface of Earth (8 min)</p> <p data-bbox="1335 1003 1902 1063">a. “How would you describe the surface of Earth in each of these photos?”</p> <p data-bbox="1335 1078 1902 1198">b. <b>Turn and Talk:</b> “Discuss this question with an elbow partner and develop an answer using descriptive terminology for the landforms and their shape.”</p> <p data-bbox="1335 1213 1902 1419">c. <b>Whole-group share-out:</b> Invite participants to share their descriptions with the group. Probe their responses (e.g., “Can you say more about that?”) and elicit differing points of view (e.g., “Does everyone agree with that observation?”). Accept all responses at this point, but note whether participants are</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>describing landforms or living things on Earth's surface.</p> <p>d. Emphasize that the structures in these photos are mostly human made, not the natural surface of Earth. Explain that geomorphologists don't include human-made structures in their definition of Earth's surface.</p>
		<p><b>Describe the Surface of Earth</b></p> 	<p><b>Display Slide 50.</b> Is it Natural, or Did Someone Make It? (5 min)</p> <p>a. "Which of these pictures show the natural surface of Earth, and which show something people have built on the surface? How do you know?"</p> <p>b. Probe participants' ideas (e.g., "Can you say more about that?") and elicit differing points of view (e.g., "Does everyone agree with that observation?"). Then ask, "What would your 2nd graders think?"</p> <p>c. Remind participants that geomorphologists don't include human-made structures in their definition of Earth's surface.</p>
		<p><b>Reflect: Content Deepening Focus Question 1</b></p> <p>What does the surface of Earth look like?</p>	<p><b>Display Slide 51.</b> Reflect: Content Deepening Focus Question 1 (5 min)</p> <p>a. Review the focus question on the slide.</p> <p>b. "Reflect on this question for a moment and then share your ideas with the group. Make sure to support your ideas with evidence from our investigations so far."</p> <p>c. During this discussion, record participants' ideas on chart paper. Ask probe questions (e.g., "Can you say more about that?") and</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>elicit differing points of view (e.g., “Does everyone agree with that observation?”).</p> <p>d. Work toward a consensus about what the surface of Earth looks like and record it on chart paper.</p>
<b>10-MINUTE BREAK</b>			
			<p><b>Display Slide 52.</b> Earth’s Changing Surface: Lesson 1b (Less than 1 min)</p> <p>a. “Now let’s explore science ideas about Earth’s changing surface from ECS lesson 1b.”</p>
		<p><b>Content Deepening: Focus Question 2</b></p> <p>How can we make models out of sand to show the shapes of different landforms?</p>	<p><b>Display Slide 53.</b> Content Deepening: Focus Question 2 (Less than 1 min)</p> <p>a. Read the focus question on the slide.</p> <p>b. Emphasize that this question will guide student learning throughout ECS lesson 1b.</p> <p>c. Have participants write the question in their science notebooks and draw a box around it.</p>


PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="871 285 1163 310">What Landform Do You See?</p> 	<p data-bbox="1335 261 1850 318"><b>Display Slide 54.</b> What Landform Do You See? (5 min)</p> <ol data-bbox="1335 370 1906 837" style="list-style-type: none"> <li>“Before we think about how we can make models of landforms out of sand, let’s practice identifying and describing some different landforms.”</li> <li>“Look at this image from our earlier investigation. What landform do you see?”</li> <li>As participants share their observations, record them on chart paper. Probe participants’ responses (e.g., “How do you know this is a landform?”) and elicit differing points of view (e.g., “Does everyone agree with that observation?”).</li> <li>Ask participants, “How would 2nd graders describe this landform?”</li> </ol> <p data-bbox="1335 862 1457 886"><b>Key idea:</b></p> <ul data-bbox="1335 894 1885 951" style="list-style-type: none"> <li>Landform descriptions shouldn’t include life-forms, such as trees or grass.</li> </ul>
		<p data-bbox="871 1013 1163 1037">What Landform Do You See?</p> 	<p data-bbox="1335 989 1850 1045"><b>Display Slide 55.</b> What Landform Do You See? (5 min)</p> <ol data-bbox="1335 1097 1885 1393" style="list-style-type: none"> <li>“Look at another image from our earlier investigation. What landform do you see?”</li> <li>As participants share their observations, record them on chart paper. Probe participants’ responses (e.g., “How do you know this is a landform?”) and elicit differing points of view (e.g., “Does everyone agree with that observation?”).</li> <li>Ask participants, “How would 2nd graders</li> </ol>



PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>describe this landform?"</p> <p><b>Key idea:</b></p> <ul style="list-style-type: none"> <li>Landform descriptions shouldn't include life-forms, such as trees or grass.</li> </ul>
		<p><b>Landforms</b></p> <ul style="list-style-type: none"> <li>What is a landform?</li> <li>What are some examples of landforms?</li> </ul> 	<p><b>Display Slide 56.</b> Landforms (7 min)</p> <p>a. Read the questions on the slide.</p> <p>b. <b>Turn and Talk:</b> "Talk about these questions with an elbow partner and see if you can come up with a definition and several examples of landforms."</p> <p>c. <b>Whole-group share-out:</b> Invite pairs to share their definitions and examples with the group. Record participants' ideas on chart paper.</p> <p>d. Ask the group, "Can anyone add to or revise this definition of a landform? Can you think of other examples?"</p> <p>e. Work together to reach a consensus on the definition of a landform and record it on chart paper.</p>
		<p><b>Let's Build Landforms!</b></p> <ol style="list-style-type: none"> <li>Look at your group's landform picture cards and decide which landform each of you will make. (Each group member will make only one landform.)</li> <li>Use the sand on your tray to build your landform model. Shape the sand with your hands.</li> <li>Use your landform picture card as a guide to help you make your landform.</li> <li>When you've finished making your model, place the correct label on your landform.</li> </ol>	<p><b>Display Slide 57.</b> Let's Build Landforms! (25 min)</p> <p>a. "Now that we've defined what landforms are and have identified a number of examples, let's build some models of different landforms out of sand."</p> <p>b. Have participants gather in small groups of four. Distribute a laminated set of four different landform picture cards (from handout 5.6) to each group, along with the corresponding landform labels (from handout 5.7). Then give</p>

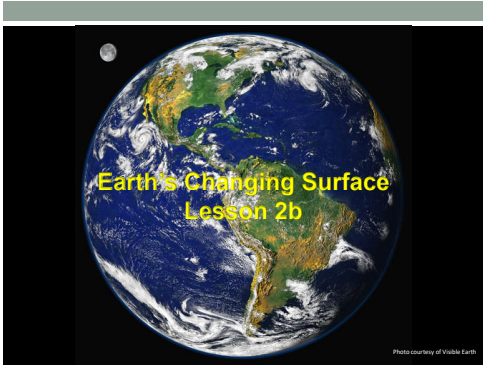


PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p>each group a blue plastic tablecloth to spread across the surface the group will be using and four trays of dampened sand.</p> <p>c. Tell participants that the blue tablecloth represents water, and the sand represents land.</p> <p>d. Read through the instructions on the slide. Emphasize that each group member should make only one landform, so groups will need to divvy up the landform picture cards. Each group member should also have only one tray of sand for creating the landform model.</p> <p><b>Note:</b> Make sure that all nine landforms have been divvied up among the groups: mountain, hill, plain, valley, canyon, plateau, river, lake, and delta. If any of the landforms hasn't been selected, ask a volunteer to swap out his or her landform with that one.</p> <p>e. Remind participants to attach the correct landform label to their model when they're finished.</p> <p>f. <b>Whole-group share-out:</b> Invite participants to share their landform models with the group. Then have them examine all of the models and discuss these questions:</p> <ul style="list-style-type: none"> <li>• What are some of the best examples of landforms among our models?</li> <li>• Which landforms were easiest to make?</li> <li>• Which landforms were more difficult to make?</li> </ul>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p><b>Reflect: Content Deepening Focus Question 2</b></p> <p>How can we make models out of sand to show the shapes of different landforms?</p>	<p><b>Display Slide 58.</b> Reflect: Content Deepening Focus Question 2 (4 min)</p> <p>a. Review the focus question on the slide.</p> <p>b. Use this opportunity to debrief on the activity and elicit feedback from participants by asking the following questions:</p> <ul style="list-style-type: none"> <li>• How well did our landform models represent the actual landforms?</li> <li>• How could we have demonstrated the shapes of different landforms more accurately?</li> <li>• What other ideas do you have about how we could represent the shapes of different landforms?</li> <li>• What difficulties do you think your students will have with this activity?</li> </ul>
			<p><b>Display Slide 59.</b> Earth's Changing Surface: Lesson 2a (Less than 1 min)</p> <p>a. "Next, we'll explore science ideas about Earth's changing surface from ECS lesson 2a."</p>


PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p><b>Content Deepening: Focus Question 3</b></p> <p>How does the land on Earth’s surface look different in different places?</p>	<p><b>Display Slide 60.</b> Content Deepening: Focus Question 3 (Less than 1 min)</p> <ol style="list-style-type: none"> <li>Read the focus question on the slide.</li> <li>Emphasize that this question will guide student learning throughout ECS lesson 2a.</li> <li>Have participants write the question in their science notebooks and draw a box around it.</li> </ol>
		<p><b>Land Detectives</b></p> <ul style="list-style-type: none"> <li>Find Seattle, Washington, and Atlanta, Georgia, on your relief map and study each place carefully. <ul style="list-style-type: none"> <li>What do you notice?</li> <li>What landforms does each place have?</li> </ul> </li> </ul>	<p><b>Display Slide 61.</b> Land Detectives (8 min)</p> <ol style="list-style-type: none"> <li>“Next, we’re going to become land detectives and investigate how the surface of Earth looks in different locations on a relief map.”</li> <li>Have participants form small groups. Then give each group a plastic relief map of the United States.</li> <li>Ask participants to find Seattle and Atlanta on their relief maps. Hold up one of the relief maps and point to each location.</li> <li>Read the questions on the slide and ask participants to discuss these questions in their small groups.</li> <li>While groups are discussing the questions, draw a Venn diagram on chart paper, with one circle labeled Seattle overlapping another circle labeled Atlanta. (See the sample diagram in ECS handout 2.1—Land Detectives—in the lesson plans binder.)</li> <li><b>Whole-group discussion:</b> Invite participants</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p data-bbox="871 365 1312 389" style="background-color: #cccccc; margin: 0; padding: 2px;">Land Detectives</p> <p data-bbox="871 406 1039 430"><b>Land Detectives</b></p> <ul data-bbox="871 454 1249 576" style="list-style-type: none"> <li>• How is the land in Seattle and Atlanta the same?</li> <li>• How is it different?</li> <li>• What does our Venn diagram show us?</li> </ul>	<p data-bbox="1354 243 1900 332">to share their ideas for answering the questions on the slide. Record key ideas on chart paper.</p> <p data-bbox="1333 365 1858 397"><b>Display Slide 62.</b> Land Detectives (5 min)</p> <ol data-bbox="1333 446 1911 1088" style="list-style-type: none"> <li>a. “Now we’re going to use a Venn diagram to compare the land in Seattle, Washington, and Atlanta, Georgia. Think about what you observed about these locations on the relief map. How is the land the same in both places? How is it different?”</li> <li>b. Elicit ideas from participants and write descriptive terms and landform names on the Venn diagram. <ul data-bbox="1375 755 1890 901" style="list-style-type: none"> <li>• Write the unique features of a particular location in the circle for that city.</li> <li>• If both locations share features or characteristics, write them in the overlapping area of the diagram.</li> </ul> </li> <li>c. Ask participants, “Does everyone agree with this idea? Do you have any corrections or additions to make to our diagram?”</li> <li>d. After finalizing the Venn diagram, discuss what it reveals about the land in each location.</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			<p><b>Display Slide 63.</b> Earth's Changing Surface: Lesson 2b (Less than 1 min)</p> <p>a. "Our last investigation will focus on science ideas about Earth's changing surface from ECS lesson 2b."</p>
		<p><b>Content Deepening: Focus Question 3</b></p> <p>How does the land on Earth's surface look different in different places?</p>	<p><b>Display Slide 64.</b> Content Deepening: Focus Question 3 (Less than 1 min)</p> <p>a. Review the focus question on the slide.</p> <p>b. "This question will guide student learning throughout ECS lesson 2b as well."</p>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p><b>Land Detectives</b></p> <ul style="list-style-type: none"> <li>• Find Chicago, Illinois, and Salt Lake City, Utah, on your relief map and study each place carefully.</li> <li>• What landforms does each place have?</li> <li>• How is the land the same in both places?</li> <li>• How is the land different?</li> <li>• Look for evidence to answer our focus question, <i>How does the land on Earth's surface look different in different places?</i></li> </ul>	<p><b>Display Slide 65.</b> Land Detectives (6 min)</p> <ol style="list-style-type: none"> <li>a. "Let's investigate two new locations on our relief maps."</li> <li>b. Read the instructions and questions on the slide.</li> <li>c. Ask participants to discuss these questions in their small groups.</li> <li>d. While groups are discussing the questions, draw a Venn diagram on chart paper, with one circle labeled Chicago overlapping another circle labeled Salt Lake City. (See the sample diagram in ECS handout 2.4—Land Detectives—in the lesson plans binder.)</li> </ol>
		<p><b>Land Detectives</b></p> <ul style="list-style-type: none"> <li>• How is the land in Chicago and Salt Lake City the same?</li> <li>• How is it different?</li> </ul>	<p><b>Display Slide 66.</b> Land Detectives (4 min)</p> <ol style="list-style-type: none"> <li>a. Use the new Venn diagram to compare the land in Chicago and Salt Lake City. Ask participants to think about what they observed about these locations on the relief map. How is the land the same in both places? How is it different?</li> <li>b. Elicit ideas from participants and write descriptive terms and landform names on the Venn diagram. <ul style="list-style-type: none"> <li>• Write the unique features of a particular location in the circle for that city.</li> <li>• If both locations share features or characteristics, write them in the overlapping area of the diagram.</li> </ul> </li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p><b>Making Claims</b></p> <p>Use these sentence starters to develop claims about how Chicago and Salt Lake City are the same and different:</p> <ul style="list-style-type: none"> <li>• <b>The same:</b> <i>Both Chicago and Salt Lake City have _____ . The land in Chicago and Salt Lake City is the same because _____ .</i></li> <li>• <b>Different:</b> <i>Chicago has _____ , but Salt Lake City doesn't. Salt Lake City has _____ , but Chicago doesn't. The land in Chicago and Salt Lake City is different because _____ .</i></li> </ul>	<p><b>Display Slide 67.</b> Making Claims (5 min)</p> <ol style="list-style-type: none"> <li>a. “Now I’d like you to use the sentence starters on this slide to make claims about how landforms in Chicago and Salt Lake City are the same and different. Make sure to support your claims with evidence.”</li> <li>b. Invite participants to share their claims and evidence by complete the sentence starters. Record their claims and evidence on chart paper.</li> <li>c. Ask the group, “Does everyone agree with this claim and evidence? Do you have any corrections or additions you’d like to make?”</li> <li>d. Work together to reach a consensus on each claim.</li> <li>e. Ask, “What challenges do you predict your 2nd graders will have arriving at these conclusions?”</li> </ol>
		<p><b>Reflect: Content Deepening Focus Question 3</b></p> <p>How does the land on Earth’s surface look different in different places?</p>	<p><b>Display Slide 68.</b> Reflect: Content Deepening Focus Question 3 (5 min)</p> <ol style="list-style-type: none"> <li>a. Review the focus question on the slide.</li> <li>b. <b>Individuals:</b> Answer this question in your science notebooks using evidence from our relief maps, Venn diagrams, and landform models to support your ideas.</li> <li>c. <b>Whole group:</b> Invite participants to share their ideas and evidence with the group.</li> </ol>

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p> <b>Key Science Ideas</b></p> <ul style="list-style-type: none"> <li>• Some places on Earth have landforms like mountains, hills, or plateaus that rise high above the surface.</li> <li>• Other places have valleys and canyons that cut into Earth's surface.</li> <li>• Some places are flat with very little change in elevation, like plains.</li> <li>• Some places have many bodies of water, such as rivers and lakes, and others places don't.</li> </ul>	<p><b>Display Slide 69.</b> Key Science Ideas (Less than 1 min)</p> <p>a. Review the key science ideas on the slide.</p>
<p>3:10–3:30 20 min</p> <p><b>Wrap-Up: Summary, Homework, and Reflections</b></p> <p>Slides 70–75</p>	<p><b>Purpose</b></p> <ul style="list-style-type: none"> <li>• Summarize and reflect on key ideas from today's learning, including the Science Content Storyline Lens, STeLLA strategy A, and the ECS science content.</li> </ul> <p><b>What Participants Do</b></p> <ul style="list-style-type: none"> <li>• Review today's focus questions.</li> <li>• Share key ideas from today's lesson analysis (SCSL strategy A) and content deepening work.</li> <li>• Copy down the homework assignment for day 6</li> <li>• Discuss expectations for the extended homework assignment (ECS lesson plan review).</li> <li>• Write reflections on today's learning.</li> </ul> <p><b>Posters and Charts</b></p> <ul style="list-style-type: none"> <li>• Effective Science Teaching chart</li> </ul> <p><b>Handouts in PD Binder</b></p> <ul style="list-style-type: none"> <li>• 5.8 Extended Homework</li> </ul>	<p><b>Today's Focus Questions</b></p> <ul style="list-style-type: none"> <li>• What is the Science Content Storyline Lens (SCSL)?</li> <li>• Why is one main learning goal essential for science content storyline coherence?</li> <li>• What does the surface of Earth look like?</li> <li>• How can we made models out of sand to show the shapes of different landforms?</li> <li>• How does the land on Earth's surface look different in different places?</li> </ul> <p><b>Summary: Today's Lesson Analysis Work</b></p> <p>Reflect on today's session:</p> <ul style="list-style-type: none"> <li>• STL strategy 6: use and apply</li> <li>• The Science Content Storyline Lens (SCSL)</li> <li>• Science ideas and student ideas</li> <li>• SCSL strategy A: Identify one main learning goal</li> </ul> <p>Based on our work today, do you have any suggestions for modifying our image of effective science teaching?</p>	<p><b>Display Slide 70.</b> Today's Focus Questions (1 min)</p> <p>a. Review the focus questions addressed during today's session.</p> <p><b>Display Slide 71.</b> Summary: Today's Lesson Analysis Work (3 min)</p> <p>a. <b>Individual think time (1 min):</b> Ask participants to reflect on the work they accomplished during today's lesson analysis and think about the questions on the slide.</p> <p>b. <b>Whole-group share-out (2 min):</b> Invite participants to share their ideas for modifying the image of effective science teaching based</p>



PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	<ul style="list-style-type: none"> <li>5.9 Daily Reflections—Day 5</li> </ul> <p><b>Supplies</b></p> <ul style="list-style-type: none"> <li>Science notebooks</li> </ul>	<div style="border: 1px solid gray; background-color: #e0e0e0; height: 15px; margin-bottom: 10px;"></div> <p><b>Summary: Today's Content Deepening Work</b></p> <p>Name one main learning goal for today's content deepening work.</p> <p style="text-align: center;">OR</p> <p>Name one supporting science idea you learned about Earth's changing surface today.</p> <p style="text-align: center;">OR</p> <p>Name one common student idea (misconception) about Earth's changing surface.</p>	<p>on today's work. Revise the chart as needed.</p> <hr/> <p><b>Display Slide 72.</b> Summary: Today's Content Deepening Work (3 min)</p> <p><b>a. Individual think time (1 min):</b> Present the options on the slide and give participants 1 minute to come up with a statement that summarizes today's content deepening work in one of these areas.</p> <p><b>b. Whole-group round-robin (2 min):</b> Go quickly around the room and have each participant share one summarizing statement. <b>Push for complete sentences!</b></p> <hr/> <p><b>Display Slide 73.</b> Homework (3 min)</p> <p><b>a.</b> Review the homework assignment on the slide and have participants write it in their notebooks.</p> <p><b>b.</b> Make sure participants are clear about the reading and writing tasks.</p>
		<div style="border: 1px solid gray; background-color: #e0e0e0; height: 15px; margin-bottom: 10px;"></div> <p><b>Homework</b></p> <ol style="list-style-type: none"> <li>Read in the STeLLA strategies booklet: <ul style="list-style-type: none"> <li>SCSL strategy B: Set the purpose with a focus question or goal statement</li> <li>SCSL strategy C: Select activities that are matched to the learning goal</li> <li>SCSL strategy I: Summarize key science ideas</li> <li>STL strategy 7: Engage students in making connections by synthesizing and summarizing key science ideas</li> </ul> </li> <li>Fill in the appropriate columns on your SCSL Z-fold summary charts.</li> </ol>	

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		<p><b>Extended Homework</b></p> <ul style="list-style-type: none"> <li>• Locate handout 5.8 (Extended Homework) in your PD program binder.</li> <li>• Between now and Friday, read your assigned two-part lesson plan (parts A and B).</li> <li>• Be prepared to share your findings in a study-group conversation on our last day.</li> </ul>	<p><b>Display Slide 74.</b> Extended Homework (3 min)</p> <ol style="list-style-type: none"> <li>Go over the information on the slide.</li> <li>Have participants review the Extended Homework assignment sheet (handout 5.8), which provides further details about the assignment.</li> <li>Remind participants that they're responsible for reading parts A and B of their assigned lesson plan.</li> <li>Assign a two-part lesson to each participant.</li> <li>Ask if there are any questions about the assignment.</li> <li><b>Emphasize:</b> The group share-out on the last day of the PD program (day 8) should focus on the assignment-sheet questions (section 2). Participants won't have time to share all the details of each lesson plan.</li> </ol>
		<p><b>Reflections on Today's Session</b></p> <p><b>Reflect on lesson analysis:</b> In what way(s) did our lesson analysis work and/or our study of SCSL strategy A (one main learning goal) stretch your thinking? Give an example to support your response.</p> <p><b>Reflect on content deepening:</b> Describe how our content deepening work today helped you clarify a science-content idea.</p> <p><b>Feedback:</b> Provide feedback about today's session and the program so far (likes, dislikes, questions, concerns, suggestions).</p>	<p><b>Display Slide 75.</b> Reflections on Today's Session (7 min)</p> <ol style="list-style-type: none"> <li>Allow <b>at least 5 minutes</b> for participants to think about today's session and write their reflections and feedback on the Daily Reflections sheet (handout 5.9 in PD program binder).</li> </ol>