RESPeCT Summer Institute Professional Development Leader Guide (PDLG)

Grade Level	4	Day	4	STeLLA Strategy	STL Strategy 6: Use and Apply New Science Ideas	Subject Matter Focus	Earth's Changing Surface

Focus Questions	• Why is it necessary to engage students in using and applying new science ideas in a variety of ways and contexts? • How will the Student Thinking Lens strategies help you teach the Earth's Changing Surface (ECS) lessons? • How does flowing water change Earth's surface? • How can we use what we've learned about Earth's changing surface to answer the unit central questions?
Main Learning Goals	Participants will understand the following: • In order to develop meaningful understandings of science ideas, students need multiple opportunities to try using and applying new science ideas in a variety of ways and contexts. • The processes of erosion and deposition change the surface of Earth by carrying weathered earth materials, such as rocks and soil, from one place and depositing them in another place. • Landforms, like mountains and valleys, can be explained using science ideas about plate movement, weathering, and erosion. At any given point in time, Earth's surface is being built up and worn down.

Preparation

Daily Setup Tasks

- Check that video clips are correctly linked to PowerPoint (PPT) slides.
- Set up PowerPoint.
- Make sure video clips play correctly with good sound.
- Arrange furniture and food.
- Arrange participant materials.
- Put up posters and charts.

Planning and Preparation Tasks

- Study the PDLG, PowerPoint slides (PPTs), video clips, and handouts. Make changes to PPTs if needed.
- Review the reflections from day 3 and create a summary slide.
- Watch video clips and anticipate participant responses.
- Prepare charts for the day's agenda and focus questions.
- Review the activities for ECS lessons 6a/b and 7a/b in the lesson plans binder.
- Using PPT slide 24 as a model, prepare a

Materials

Posters and Charts

- STeLLA Framework and Strategies poster
- Day-4 Agenda (chart)
- Day-4 Focus Questions (chart)
- Norms for Working Together (chart)
- Strategy charts from days 1–3 (STL strategies 1–5)
- Chart of STL strategies highlighted in ECS lesson plans (see PPT slide 24 for model)
- Parking Lot poster

Handouts in RESPeCT PD Binder Front Pocket

- Z-fold summary chart: Student Thinking Lens Strategies

Handouts in RESPeCT PD Binder, Day 4

- 4.1 Importance of Engaging Students in Constructing Scientific Explanations (task sheet)
- 4.2 Student Work from Zembal-Saul Book *What's Your Evidence?*
- 4.3 Benefits of Engaging Students in Constructing Scientific Explanations
- 4.4 Transcript for Video Clip 4.1
- 4.5 Transcript for Video Clip 4.2

Videos

- Hershberger video clip, *Introducing the CER* (on companion DVD for Zembal-Saul book *What's Your Evidence?*)
- Video Clip 4.1: Potter classroom (use and apply); 4.1_stella2-04-potter4-L6_c1-c2
- Video Clip 4.2: Torres classroom (review strategies 1–6); 4.2_stella2-04-torres4-L3_c5
- Video Clip 4.3: Torres classroom (review strategies 1–6); 4.3_stella2-04-torres4-L3_c6
- Video Clip 4.4: Torres classroom (review strategies 1–6); 4.4_stella2-04-torres4-L3_c7
- Video Clip 4.5: Torres classroom (review strategies 1–6); 4.5_stella2-04-torres4-L3_c8

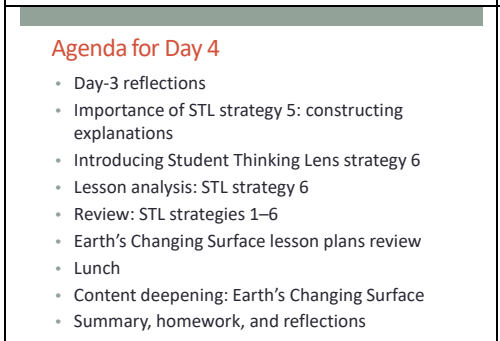
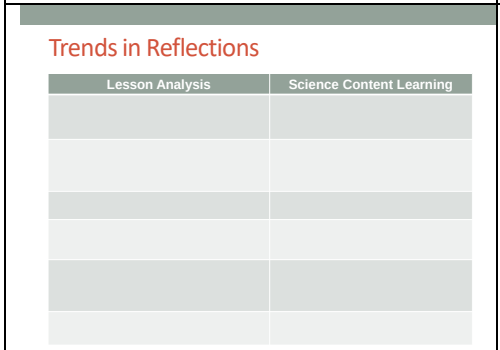
chart of the STL strategies highlighted in the ECS lesson plans.
• Content deepening:
  • Assemble materials for the stream-table apparatus. Review setup directions on the overview page of ECS lesson 6a and see the photo in ECS handout 6.3 (Example of Stream-Table Setup).
  • Set up the stream-table apparatus at front of the room during lunch break the day of the session. Adjust the slope to the proper angle so that some earth materials will easily wash down the slope and others won't.
  • Decide where to dispose of the sand and water following the activity (not in a sink).
  • Cut apart the erosion and deposition cards from handout 4.10 and stack them next to the stream-table apparatus.
	• 4.6 Transcript for Video Clip 4.3
	• 4.7 Transcript for Video Clip 4.4
	• 4.8 Transcript for Video Clip 4.5
	• 4.9 Identifying Student Thinking Lens Strategies
	• 4.10 Erosion and Deposition Cards (from ECS lesson 6a)
	• 4.11 Building Up and Wearing Down Earth's Surface (from ECS lesson 7a)
	• 4.12 Daily Reflections—Day 4
	
	Handouts in RESPeCT Lesson Plans Binder
	• 4.1 Map of Plate Boundaries around the World (from ECS lesson 4a)
	• 4.2 Physical Map of the World (from ECS lesson 4b)
	
	Supplies
	• Science notebooks
	• Chart paper and markers
	• Science-lesson materials kit (Earth's changing surface)
	• Stream-table apparatus for content deepening (from ECS lesson 6a):
	  • Plastic tray for catching water
	  • Plastic tray (same size as tray for catching water) with a V cut to hold the sand/soil (See ECS handout 6.3 in lesson plans binder for placement of V cut.)
	  • 2 plastic trash bags to cover the work area and floor
	  • Empty gallon water jug
	  • Aluminum foil to line tray with V cut
	  • 2–3 large books, wrapped in plastic
	  • 2 cups of sand and/or soil
	  • 1 cup of gravel and a few larger rocks
	  • Sponge or paper towels to wipe up any spills
	  • **Optional:** Large bucket of water (for rinsing hands and to carry water outside)
	  • Protractors
	• For content deepening (Investigation 4):
	  • Plastic relief map of the United States (1 per pair) (from ECS lesson 1a)	

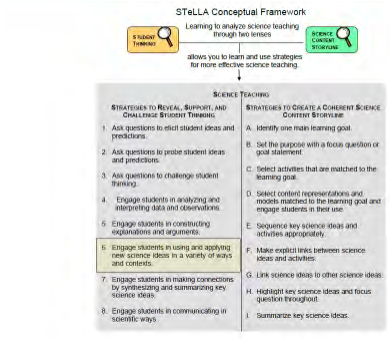
	PD Resources • STeLLA strategies booklet • RESPeCT PD program binder • RESPeCT lesson plans binder **Resources in Lesson Plans Binder** *Resources section:* • Earth's Changing Surface Content Background Document • Common Student Ideas about Earth's Changing Surface	

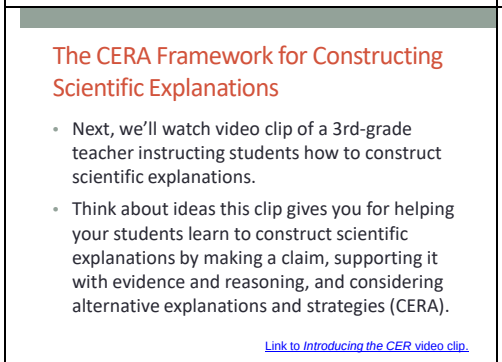
DAY 4 SESSION OUTLINE

Time	Activities	Purpose
8:00–8:15 15 min	**Getting Started: Housekeeping, Agenda, Day-3 Reflections, Focus Questions**	• Build community by sharing participants' reflections from day 3. • Set the stage for a day of learning.
8:15–8:50 35 min	**Importance of STL Strategy 5: Constructing Explanations**	• Develop an appreciation for the multiple ways in which engaging students in constructing scientific explanations can have an impact on student learning within and beyond science.
8:50–9:10 20 min	**Introducing Student Thinking Lens (STL) Strategy 6**	• Develop an initial understanding of the purpose and key features of strategy 6: Engage students in using and applying new science ideas in a variety of ways and contexts.
9:10–10:10 60 min	**Lesson Analysis: STL Strategy 6**	• Use lesson analysis of classroom videos to better understand strategy 6. • Deepen science-content knowledge of Earth's changing surface through lesson analysis.
10:10–10:55 45 min (Includes 10-min break)	**Review: STL Strategies 1–6**	• Review and deepen understandings of key similarities and differences among STL strategies 1–6.
10:55–12:00 65 min	**Earth's Changing Surface Lesson Plans Review**	• Understand why the ECS lesson plans are so scripted and how they should be used before and during the lessons. • Understand the conceptual flow within and across the ECS lessons. • Understand the focus question, main learning goal, and main activity in each lesson. • Understand how STL strategies 1–6 are embedded in the lessons.
12:00–12:45 45 min	**LUNCH**	
12:45–3:15 150 min (Includes 10-min break)	**Content Deepening: Earth's Changing Surface**	• Deepen participants' science-content knowledge of Earth's changing surface by conducting investigations from ECS lessons 6a/b and 7a/b.
3:15–3:30 15 min	**Wrap-Up: Summary, Homework, and Reflections**	• Summarize and reflect on key ideas from today's learning and preview the transition to the Science Content Storyline Lens (SCSL) strategies.

DAY 4

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
8:00–8:15 15 min **Getting Started** Slides 1–5	**Purpose** • Build community by sharing participants' reflections from day 3. • Set the stage for a day of learning. **What Participants Do** • Review the day's agenda. • Discuss the reflections from day 3. • Read today's focus questions. **Posters and Charts** • STeLLA Framework and Strategies poster • Day-4 Agenda (chart) • Day-4 Focus Questions (chart)		**Display Slide 1.** RESPeCT PD Program (5 min) a. Take care of any housekeeping issues.
			**Display Slide 2.** Agenda for Day 4 (3 min) a. Talk through the agenda for the day.
			**Display Slide 3.** Trends in Reflections (5 min) a. Invite participants to look at your feedback on their reflections from day 3 and offer reactions, comments, or follow-up questions.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		Today's Focus Questions 1. Why is it necessary to engage students in using and applying new science ideas in a variety of ways and contexts? 2. How will the Student Thinking Lens strategies help you teach the Earth's Changing Surface (ECS) lessons? 3. How does flowing water change Earth's surface? 4. How can we use what we've learned about Earth's changing surface to answer the unit central questions?	**Display Slide 4.** Today's Focus Questions (1 min) a. Introduce the focus questions that will guide today's work. b. "Like STeLLA strategies 4 and 5, the goal of strategy 6 is to move student thinking forward toward deeper understandings of science ideas."
			**Display Slide 5.** STeLLA Conceptual Framework (1 min) a. Draw participants' attention to the new strategy highlighted on the slide. b. "Strategy 6 is the third STL strategy that is a type of activity designed to move student thinking forward."
8:15–8:50 35 min **Importance of STL Strategy 5: Constructing Explanations**	**Purpose** • Develop an appreciation for the multiple ways in which engaging students in constructing scientific explanations can have an impact on student learning within and beyond science. **Content** • Engaging students in constructing scientific explanations helps them develop meaningful understandings	The Importance of Engaging Students in Constructing Scientific Explanations Read handout 4.1 and your group-specific handout. Then complete the assigned task: **Group 1:** Analyze a student explanation (handout 4.2). **Group 2:** Summarize benefits for students of constructing scientific explanations (handout 4.3). **Group 3:** Summarize the benefits for teachers of engaging students in constructing scientific explanations (handout 4.3).	**Display Slide 6.** The Importance of Engaging Students in Constructing Scientific Explanations (25 min) **Note:** If you need some time to catch up on day-3 activities, you can skip this slide. However, this activity is beneficial for reviewing strategy 5 (constructing explanations) and helping participants understand why explanation building is such important work in science and beyond. **Timing note:** For this segment, allot 5 minutes for

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
Slides 6–7	of science ideas and how scientists work. **What Participants Do** • Review jigsaw-strategy readings about the importance of scientific explanations and examine a sample of student work. • Share key ideas about constructing scientific explanations. • Watch and discuss a lesson video in which the teacher explicitly teaches 3rd graders how to construct explanations that include a claim, evidence, and reasoning that connects to science ideas. **Posters and Charts** • STeLLA Framework and Strategies poster • Strategy charts from days 1–3 (STL strategies 1–5) **Videos** • Hershberger video clip, *Introducing the CER* **Handouts in PD Binder** • 4.1 Importance of Engaging Students in Constructing Scientific Explanations (task sheet) • 4.2 Student Work from Zembal-Saul Book *What's Your Evidence?* • 4.3 Benefits of Engaging Students in Constructing Scientific Explanations **PD Resources** • STeLLA strategies booklet		reading, 10 minutes to prepare for a group share-out, and 10 minutes for the share-out. a. Divide participants into three groups or pairs. Assign each group a number (1, 2, 3). b. Direct participants to three handouts: 1. Importance of Engaging Students in Constructing Scientific Explanations (handout 4.1 in PD program binder) (This handout describes what groups are to do with the following two handouts.) 2. Student Work from Zembal-Saul Book *What's Your Evidence*? (handout 4.2 in PD binder) (Group 1's task is linked to this handout.) 3. Benefits of Engaging Students in Constructing Scientific Explanations (handout 4.3 in PD binder) (Tasks for Groups 2 and 3 are linked to this handout.) c. After participants have read the designated handouts for their groups and completed their assigned tasks, invite them to share out.
			**Display Slide 7.** The CERA Framework for Constructing Scientific Explanations (10 min) **Note:** This activity is optional but powerful. a. "Let's watch how one 3rd-grade teacher taught her students to construct scientific explanations. This is the teacher whose student writing Group 1 just read about. The class in this video clip has been studying simple machines (such as pulleys and levers)." b. "We're not going to analyze this video clip in terms of STeLLA strategies. Instead, think about ideas this clip gives you as to how you might introduce

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			your students to the CERA framework for constructing scientific explanations, which involves making a claim, supporting it with evidence and reasoning, and considering alternative explanations and strategies." c. After watching the clip, discuss participants' reactions and any ideas it gave them about how they might help their students learn to construct strong scientific explanations. **Note:** Make sure participants are aware that in addition to using the CERA framework as a tool for teaching students how to develop scientific explanations and arguments (STeLLA strategy 5) in the classroom, they will be using the same framework for videocase-based lesson analysis of their science teaching in RESPeCT study groups throughout the school year.
8:50–9:10 20 min **Introducing Student Thinking Lens (STL) Strategy 6** Slide 8	**Purpose** • Develop an initial understanding of the purpose and key features of strategy 6: Engage students in using and applying new science ideas in a variety of ways and contexts. **Content** • After students encounter new science ideas, they need opportunities to practice them and see their usefulness in explaining a variety of phenomena. Activities that challenge students to use and apply new ideas give them the time and space to really make sense of the concepts. **What Participants Do** • Make and discuss charts	Introducing STL Strategy 6 Engage students in using and applying new science ideas in a variety of ways and contexts. 1. What are the purpose and key features of this strategy? 2. Why do you think use-and-apply questions or activities are often shortchanged in science teaching?	**Display Slide 8.** Introducing STL Strategy 6 (20 min) a. **Small groups (10 min):** Divide participants into two groups to make charts highlighting the purpose and key features of strategy 6: Engage students in using and applying new science ideas in a variety of ways and contexts. Encourage participants to refer to the STeLLA strategies booklet and STL Z-fold summary chart for this activity. b. **Whole group (10 min):** Have groups present their charts in a whole-group share-out and compare them. Ask participants, "What differences and similarities do you notice when you compare your charts with those of other groups?" **Key ideas:** • Strategy 6 is a time for "strategic telling" and

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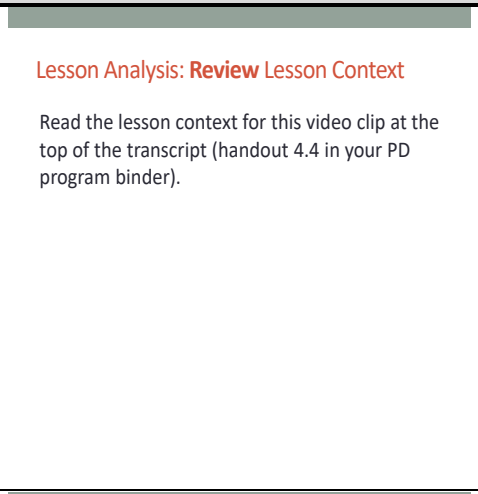
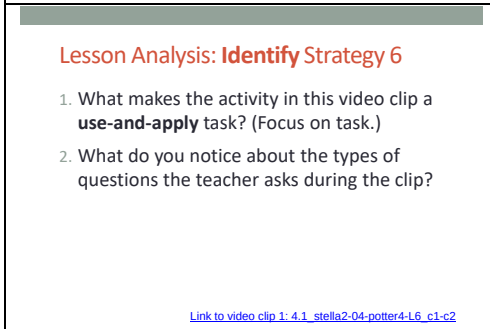
	highlighting the purpose and key features of strategy 6. **Supplies** • Chart paper and markers **PD Resources** • STeLLA strategies booklet • STL Z-fold summary chart (front pocket of PD binder)		making sure students are using science ideas accurately. • A use-and-apply question or activity is introduced *after* students have experienced/encountered a new science idea. It provides an opportunity for students to use and apply the idea in a new context or novel way and/or link two or more science ideas together. • A common misconception is that use-and-apply questions or activities *assess* student learning. Teachers often talk about asking these kinds of questions on tests. However, according to research findings published in *How People Learn* (National Academy of Sciences, 2000), *application* is part of the learning process, or developing a conceptual framework. If application is treated like assessment, students may encounter a use-and-apply question on a test without ever having had the opportunity to practice this way of thinking as part of their learning.
9:10–10:10 60 min **Lesson Analysis: STL Strategy 6** Slides 9–14	**Purpose** • Use lesson analysis of classroom videos to better understand strategy 6. • Deepen science-content knowledge of Earth's changing surface through lesson analysis. **Content** • Strategy 6 involves engaging students in using and applying new science ideas in a variety of ways	Lesson Analysis: Focus Question 1 Why is it necessary to engage students in using and applying new science ideas in a variety of ways and contexts?	**Display Slide 9.** Lesson Analysis: Focus Question 1 (Less than 1 min) a. Highlight the focus question that will guide the lesson analysis work during this phase.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	and contexts. **What Participants Do** • Watch a classroom video clip to identify strategy 6 and analyze student thinking that is revealed and challenged from using this strategy. • Check their understandings of strategy 6 by taking a quick multiple-choice quiz. **Videos** • Video Clip 4.1, Potter classroom **Handouts in PD Binder** • 4.4 Transcript for Video Clip 4.1 **PD Resources** • STeLLA strategies booklet **Resources in Lesson Plans Binder** *Resources section:* • Content background document	 	**Display Slide 10.** Lesson Analysis: Review Lesson Context (2 min) a. "Read the lesson context at the top of the video transcript (handout 4.4 in your PD program binders)." b. Make sure participants understand the science content and activity that are the focus of this video clip. **Note:** Refer to the content background document as needed throughout the lesson analysis. **Display Slide 11.** Lesson Analysis: Identify Strategy 6 (25 min) a. "As you watch the video, think about what makes the activity in this clip a use-and-apply task. What science ideas should students be using and applying in each scenario? Also notice what kinds of questions the teacher asks." b. Show the video clip. c. **Individuals:** "Think about the questions on the slide and mark the transcript as you identify the use of strategy 6." d. **Whole group:** Discuss participants' responses to the questions.

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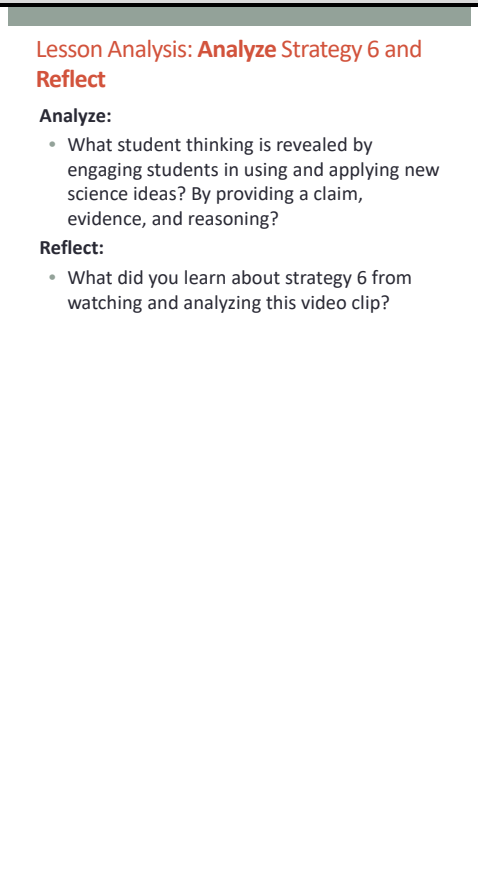
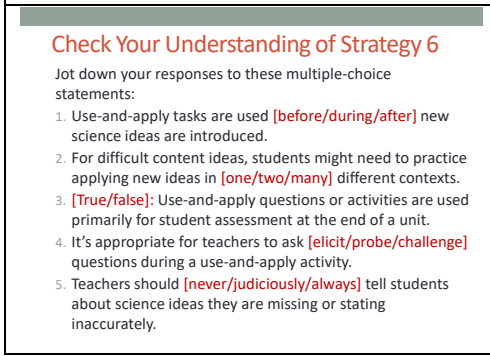
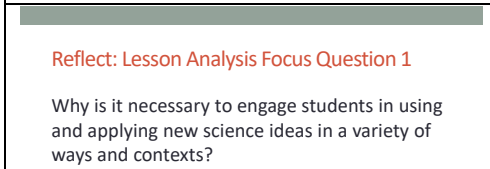
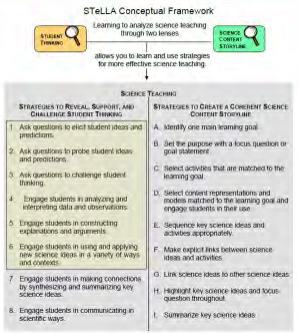
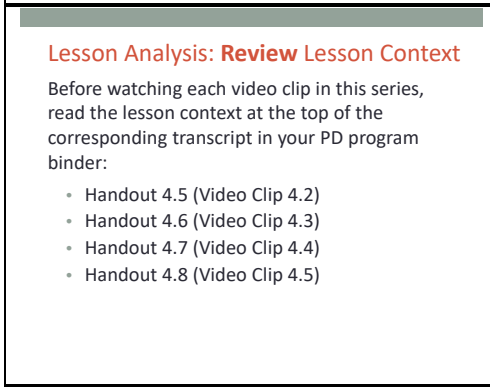
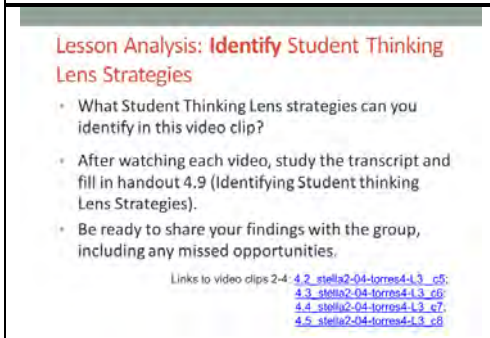
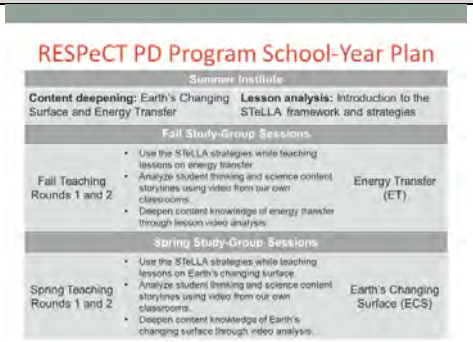
			**Display Slide 12.** Lesson Analysis: Analyze Strategy 6 and Reflect (25 min) a. **Individuals:** "For the analysis question on the slide, study the video transcript and come up with a claim, evidence, and reasoning to support your claim." b. **Whole-group share-out:** As participants share their claims, evidence, and reasoning, encourage them to challenge one another by asking questions, disagreeing, and suggesting improvements or alternative explanations and arguments. (Refer to the norms at the heart of the RESPeCT program.) **Note:** You may also want to ask participants whether they noticed in the transcript any missed opportunities for engaging students in using and applying new science ideas. c. **Reflect (1 min):** Give participants time to think about the reflection question on the slide. d. **Whole-group discussion:** Discuss the reflection question as a group. Make sure participants note specifically what they learned about strategy 6 from watching and analyzing this video clip.
			**Display Slide 13.** Check Your Understanding of Strategy 6 (5 min) **Note:** This activity is optional if time is running short. a. "To check your understanding of STL strategy 6, jot down your responses to this multiple-choice quiz." b. Have participants discuss their answers either in

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			pairs or as a group. (If time is short, just read the answers aloud.) **Answer key:** 1. After 2. Many 3. False 4. Challenge (and probe) 5. Judiciously (defined as "good or discriminating judgment; wise, sensible, or well advised")
			**Display Slide 14.** Reflect: Lesson Analysis Focus Question 1 (3 min) a. **Individuals (1 min):** "Think for a moment about how you would answer the focus question on this slide." b. **Whole-group share-out (2 min):** Have a few participants share their ideas.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
10:10–10:55 45 min (Includes 10-min break) **Review: STL Strategies 1–6** Slides 15–19	**Purpose** • Review and deepen understandings of key similarities and differences among STL strategies 1–6. **Content** • STL strategies 1–6 reveal, support, and challenge student thinking. **What Participants Do** • Study the Summary of STeLLA Student Thinking Lens Strategies chart in the STeLLA strategies booklet. • Discuss patterns, similarities, and differences among STL strategies 1–6. • Watch a classroom video clip and identify any STL strategies used during the lesson. Discuss observations and missed opportunities. **Posters and Charts** • Strategy charts from days 1–3 (STL strategies 1–5) **Videos** • Video Clip 4.2, Torres classroom • Video Clip 4.3, Torres classroom • Video Clip 4.4, Torres classroom • Video Clip 4.5, Torres classroom **Handouts in PD Binder** • 4.5 Transcript for Video Clip 4.2 • 4.6 Transcript for Video Clip 4.3 • 4.7 Transcript for Video Clip 4.4 • 4.8 Transcript for Video Clip 4.5	Lesson Analysis: Focus Question 2 How will the Student Thinking Lens strategies help you teach the Earth's Changing Surface (ECS) lessons?	**Display Slide 15.** Lesson Analysis: Focus Question 2 (Less than 1 min) **Transition:** "Now we'll shift our attention to the second lesson analysis focus question and spend some time summarizing what we've learned so far about Student Thinking Lens strategies 1–6. Then we'll review the ECS lesson plans and highlight how these strategies are used in the lessons you'll start teaching in January."
			**Display Slide 16.** STeLLA Conceptual Framework (Less than 1 min) a. "These are the Student Thinking Lens strategies we've explored so far. You'll get practice using them as you teach the Energy Transfer and Earth's Changing Surface lessons next year."
		Review: Student Thinking Lens Strategies Review the STL summary chart in the STeLLA strategies booklet and discuss these questions: 1. What pattern(s) do you see in this arrangement (organization) of the STL strategies? 2. How does this arrangement (organization) highlight the differences and similarities among the Student Thinking Lens strategies?	**Display Slide 17.** Review: Student Thinking Lens Strategies (3 min) a. **Individuals:** Have participants review STL strategies 1–6 on the summary chart in the strategies booklet (Summary of STeLLA Student Thinking Lens Strategies). b. **Whole group:** Discuss the questions on the slide. **Key ideas:** • Strategies 1–3 are types of questions, and strategies 4–6 are activities designed to move student thinking forward toward more-scientific

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	• 4.9 Identifying Student Thinking Lens Strategies **PD Resources** • STeLLA strategies booklet		understandings. • Some strategies are used at any time during the lesson (e.g., probe questions); others are used at specific times (e.g., elicit questions used *before* students have been introduced to new science ideas; use-and-apply activities used *after* students have been introduced to new science ideas). • Each strategy has its own specific purpose(s), but the strategies are closely connected to one another. That is, these strategies aren't used in isolation; they're complementary.
			**Display Slide 18.** Lesson Analysis: Review Lesson Context (1 min) a. Before showing each video clip in this series, have participants read the lesson context at the top of the corresponding transcript (handouts 4.5–4.8 in the PD program binder). b. Make sure participants understand the science content and activity that are the focus of each clip.
			**Display Slide 19.** Lesson Analysis: Identify Student Thinking Lens Strategies (30 min) **Note:** If absolutely necessary, you can skip this video analysis. a. Orient participants to handout 4.9, Identifying Student Thinking Lens Strategies. b. Before showing each video clip, make sure participants understand the context from the corresponding transcript. c. Show the video clip. d. **Individuals:** "Study the video transcript and

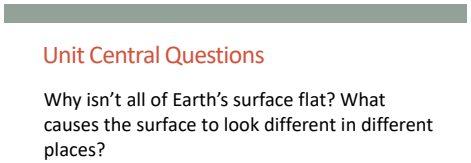
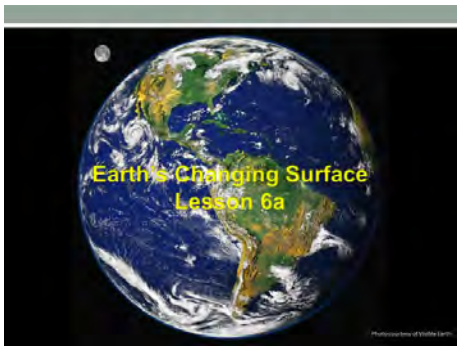
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			complete handout 4.9, Identifying Student Thinking Lens Strategies." e. **Whole group:** "What STL strategies did you identify in the video transcript? Did you spot any missed opportunities?"
10:45–10:55 10 min	**BREAK**		

10:55–12:00
65 min
Earth's Changing Surface Lesson Plans Review
Slides 20–24
	Purpose
	• Understand why the ECS lesson plans are so scripted and how they should be used before and during the lessons.
	• Understand the conceptual flow within and across the ECS lessons.
	• Understand the focus question, main learning goal, and main activity in each lesson.
	• Understand how STL strategies 1–6 are embedded in the lessons.
	Content
	• All lessons are designed to support the science content storyline within and across lessons. Each lesson contains a focus question, a main learning goal, and an activity.
	• The Student Thinking Lens strategies work together across lessons according to the following pattern:
	  • Elicit and probe strategies are very important in lesson 1.
	  • Probe and challenge strategies are used throughout all the lessons.
			**Display Slide 20.** RESPeCT PD Program School-Year Plan (2 min)
			a. "Before we share our reports about each of the Earth's Changing Surface lesson plans and how they support you in practicing these Student Thinking Lens strategies, let's review the plan for the school year."
			b. "In the fall, you'll teach the Energy Transfer lessons, and we'll meet in our study group to analyze video clips and student work from these lessons. This analysis will help us deepen our understandings of the STeLLA strategies, the science content, the lesson plans, and our students' thinking and learning."
			c. "Starting in January, you'll teach the Earth's Changing Surface lessons, and we'll meet in our study group to analyze video clips and student work from these lessons. Do you have any questions?"
			d. **Important reminder:** "Remember that we're analyzing video clips of our own classroom teaching to help us all learn, not to evaluate and critique one another. Everyone is learning to use both new strategies and new lesson plans, so it's predictable that our first attempts at teaching these

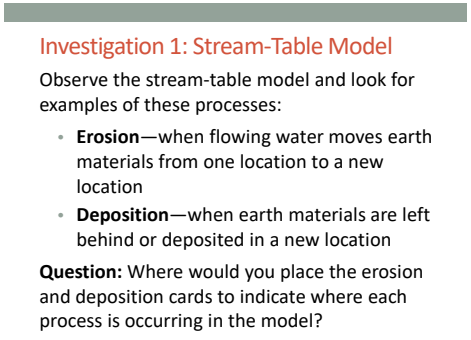
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	• Strategies 4 and 5 are highlighted in the middle lessons. • Strategy 6 is highlighted toward the end of the lesson, after students encounter new science ideas but before final unit assessments. **What Participants Do** • Review the plans for school-year study groups. • Listen to the PD leader describe the lesson plans for the study groups and how they should be used/adapted. • Present a summary of an assigned lesson plan to help their peers understand the lesson. • Raise questions and concerns about the lesson plans and make suggestions. **Supplies** • Chart paper and markers **PD Resources** • RESPeCT lesson plans binder		lessons will have rough spots. We need to appreciate and acknowledge the courage each of us is demonstrating in sharing our initial efforts to teach these lessons. Please be assured that our analyses of the videos will focus on the strategies, the science content, and most importantly, how students are making sense of the lessons. We're not going to focus on rough spots or management problems. We're here to support one another and to learn and grow as science teachers."
		The RESPeCT Lesson Plans as a Study Tool: Part 1 The RESPeCT lesson plans are **study tools** designed to support your learning and for our study group to analyze. This has two implications. 1. These lessons don't represent a complete unit. You may need to add lessons to help your students achieve all the learning goals, and …	**Display Slide 21.** The RESPeCT Lesson Plans as a Study Tool: Part 1 (1 min) a. Read through the information on this slide. b. Elicit and respond to any comments or questions from participants.
		The RESPeCT Lesson Plans as a Study Tool: Part 2 2. As a study tool, the lesson plans are highly scripted to model how they might be implemented. a. Study this script in your lesson planning. b. Adapt the plans and PowerPoint slides to make them work for you and your students (but don't add or drop main activities). c. You don't have to be tied to the script as you teach! Using the slides as a guide can help free you from the script.	**Display Slide 22.** The RESPeCT Lesson Plans as a Study Tool: Part 2 (2 min) a. Read through the information on this slide. b. Elicit and respond to any comments or questions from participants.

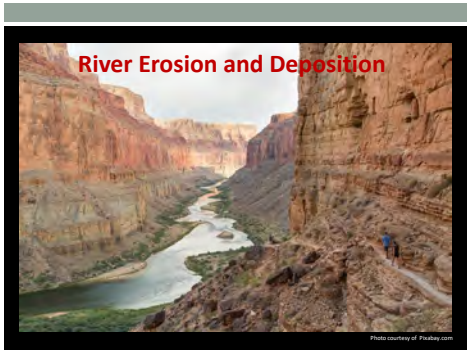
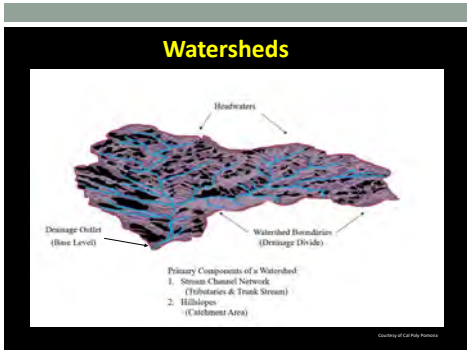
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
		Lesson Plan Conversation 1. **The science content storyline across lessons** • Review the main learning goal for each lesson sequentially. 2. **The science content storyline within lessons** (5–8 min for each two-part lesson) • How does this lesson fit into the arc of all the lessons? • What are the main learning goal and focus question? • What is the main activity (or activities)? • How will the activity help students better understand the learning goal for the day? • What STeLLA strategies are highlighted in the activity? • What concerns or suggestions do you have regarding the activity? 3. **Practical issues and questions**	**Display Slide 23.** Lesson Plan Conversation (60 min in conjunction with next slide) a. For step 1 on the slide, have participants describe the main learning goal for their assigned two-part lesson (parts A and B) and how it connects to the lessons that precede and follow it. (5 min) b. For steps 2 and 3, have participants report on their assigned two-part lesson. **Note:** Rather than walking through every step in the lesson plan, participants should present the *big picture* using the questions in step 2 on the slide. They should bring up details only when they have some concern, question, or suggestion about a modification. c. As participants give their reports, mark on a chart the Student Thinking Lens strategies that are highlighted in each lesson. (Use the chart on the next slide as a model.) **Note:** Encourage participants to pick just one or two Student Thinking Lens strategies that are highlighted in the lesson. (Several strategies may be used in a lesson.) d. Highlight the following ideal pattern and how the STL strategies work together across lessons: • Elicit and probe strategies are very important in lesson 1. • Probe and challenge strategies are used throughout all the lessons. • Strategies 4 and 5 are highlighted in the middle lessons. • Strategy 6 is highlighted toward the end of a lesson, after students encounter new science ideas but before final unit assessments.

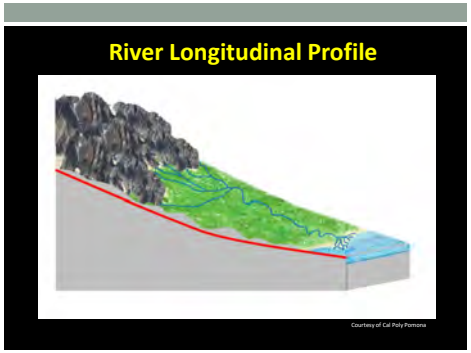
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			Timing note: Make sure you limit the time allotted for each lesson so you can get through them all. If you have 6 two-part lessons, you'll have approximately 8 minutes for each lesson (4 minutes for part A, and 4 minutes for part B). If your lesson series has more than 6 two-part lessons, you'll have to decrease the time for each lesson.
			**Display Slide 24.** STL Strategies Highlighted in ECS Lessons a. Use this slide in conjunction with the previous slide.
12:00–12:45 45 min	**LUNCH**		
12:45–3:15 150 min (Includes 10-min break) **Content Deepening: Earth's Changing**	**Purpose** • Deepen participants' science-content knowledge of Earth's changing surface by conducting investigations from ECS lessons 6a/b and 7a/b. **Content** • 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		**Display Slide 25.** Content Deepening: Earth's Changing Surface (Less than 1 min) a. **Transition:** This slide marks the transition to the content deepening work. **Note:** Throughout this content deepening phase, refer as needed to the content background document and Common Student Ideas about Earth's Changing Surface.

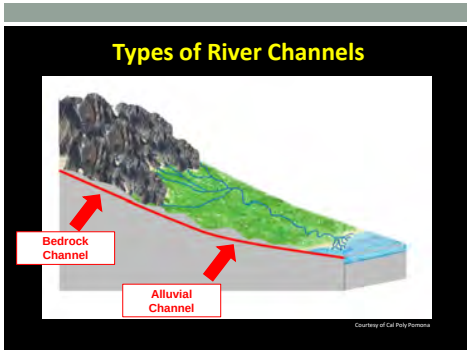
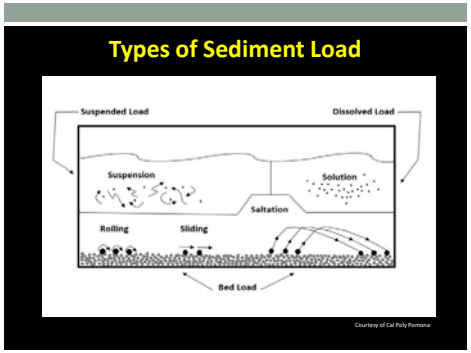
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
Surface Slides 25–62	time. • Stream scientists use stream-table models to investigate how flowing water changes Earth's surface • A watershed is a natural system that transports rainwater runoff and eroded sediment from one location to another. • Most rivers begin in a mountainous headwaters area of a watershed and flow downward into a valley that leads to a drainage outlet at an ocean, a lake, or another bigger river. • Rivers erode their beds by either removing sediment grains that have accumulated on the bed or by cutting directly into the hard bedrock beneath the sediment. • Water depth and channel steepness determine the speed at which the water flows. So flow velocity is also related to a river's ability to erode its bed. More water and/or a steeper streambed increase erosion. • Rivers are dynamic systems that respond to changing conditions within the watershed. As plate tectonics build up Earth's surface and erosion wears it down, rivers respond by adjusting their profile to achieve a balance between opposing forces. **What Participants Do** • Explore and discuss key science ideas behind ECS lessons.		**Display Slide 26.** Today's Content Deepening (Less than 1 min) a. "Today's content deepening will focus on science ideas about Earth's changing surface from ECS lessons 6a/b and 7a/b."
		**Display Slide 27.** Unit Central Questions (Less than 1 min) a. Review the unit central questions on the slide. b. Remind participants that these questions will guide student learning throughout the entire series of ECS lessons. c. "By the end of today's content deepening session, we should have enough information from all of our investigations to answer these questions."
		**Display Slide 28.** Earth's Changing Surface: Lesson 6a (Less than 1 min) a. "First, we'll explore science ideas about Earth's changing surface from lesson 6a."

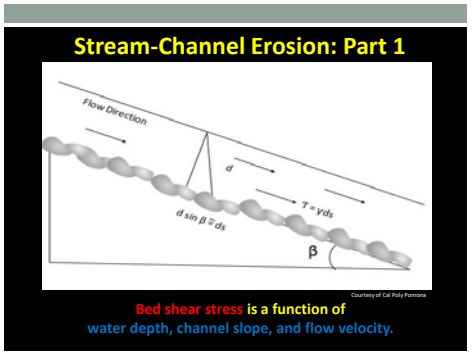
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	• Apply content learning to answer the unit central questions and the focus questions for lessons 6a/b and 7a/b. **Handouts in PD Binder** • 4.11 Building Up and Wearing Down Earth's Surface (from ECS lesson 7a) **Handouts in Lesson Plans Binder** • 4.1 Map of Plate Boundaries around the World (from ECS lesson 4a) • 4.2 Physical Map of the World (from lesson 4b) **Supplies** • Science notebooks • Chart paper and markers • Science-lesson materials kit (Earth's changing surface) • Stream-table apparatus (see supplies and preparation instructions on overview page) • Erosion and depositions cards (cut apart; from handout 4.10) • Plastic relief map of the United States (1 per pair) (from ECS lesson 1a)	Content Deepening: Focus Question 1 How does flowing water change Earth's surface?	**Display Slide 29.** Content Deepening: Focus Question 1 (Less than 1 min) a. Read the focus question on the slide. b. Emphasize that this question will guide student learning throughout ECS lesson 6a. c. Have participants write this question in their science notebooks and draw a box around it.
		Investigation 1: Stream-Table Model 	**Display Slide 30.** Investigation 1: Stream-Table Model (5 min) a. Have participants bring their notebooks and pencils to the front of the room and gather around the stream-table model. **Note:** You should already have set up the stream-table apparatus and stacked the erosion and deposition cards on the table next to the apparatus. b. Divide the group into pairs. Ask participants to examine the apparatus and discuss their initial observations with their partners.

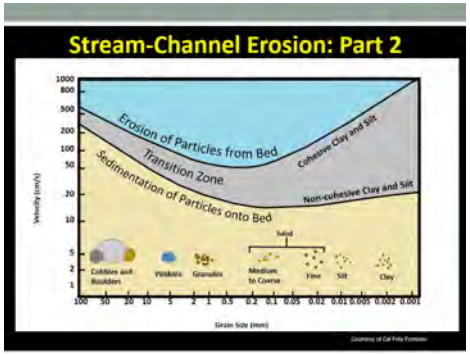
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
	Resources in Lesson Plans Binder *Resources section:* • Content background document • Common Student Ideas		**Display Slide 31.** Investigation 1: Stream-Table Model (20 min) a. "Today we'll become stream scientists and use this stream-table model to investigate how flowing water changes Earth's surface." b. Read the instructions and the question on the slide. c. Begin the investigation by slowly opening the valve on the water jug. (Be sure to loosen the cap on top to allow for proper airflow.) d. Adjust the valve so the water flow isn't too strong but is adequate to erode the sand, form a stream channel, and deposit sand at the bottom of the tray. e. **Pairs:** Direct pairs to look for examples of erosion and deposition taking place in the model and discuss where they would place the erosion and deposition cards to indicate where each process is occurring. f. **Whole-group discussion:** Following the investigation, invite pairs to share with the group their observations and answers to the question on the slide. Probe participants' responses and elicit differing points of view. g. During the discussion, record key ideas and observations on chart paper.

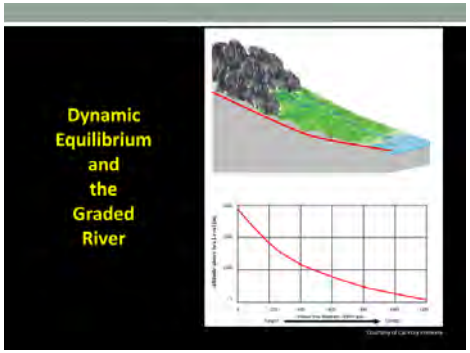
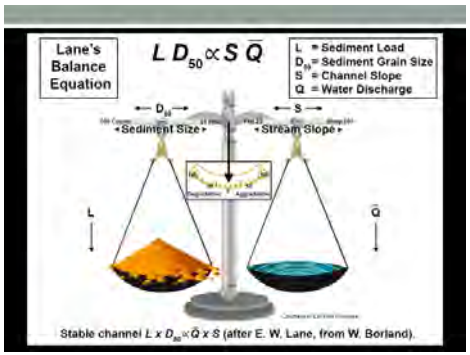
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			**Display Slide 32.** River Erosion and Deposition (Less than 1 min) a. "Let's review some key science ideas about erosion and deposition." b. "This slide shows the Colorado River flowing through the Grand Canyon. It's a familiar example of a river eroding its bed and cutting a canyon through hard rock. The flowing water erodes the rock and carries sediment away to be deposited somewhere else downstream, such as behind a dam or in the Colorado River delta at the Gulf of California."
			**Display Slide 33.** Watersheds (3 min) a. "To understand river erosion and deposition, we must first understand the concept of a watershed, sometimes called a *drainage basin*." b. "A *watershed* is an area of Earth's surface drained by a particular river. *Drainage divides*, like those on the slide, are boundaries that separate a watershed from neighboring watersheds. These divides are high points, like ridgelines, that surround a watershed." c. "*Headwaters* mark the upper end of a watershed, and the lower end is called a *drainage outlet* or *base level*. The outlet is the lowest elevation point in the watershed where the main river or stream flows out of the basin." d. "The main river or stream in the watershed is called the *trunk river* or *trunk stream*. Smaller streams or rivers that feed into the trunk stream are called *tributaries*. Together, a trunk stream and

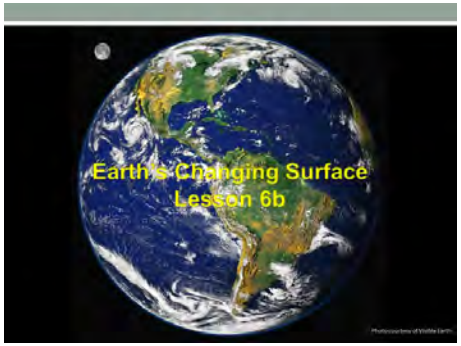
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			its tributaries make up a *stream channel network* that funnels rain runoff and sediment from the landscape into the trunk stream." e. "*Hill slopes* are located between stream channels. In this area of land, precipitation either infiltrates or soaks into the ground or flows downhill into a stream channel as runoff." f. "A watershed is a natural system that transports rainwater runoff and eroded sediment into the trunk stream and out of the basin at the drainage outlet for deposition elsewhere."
			**Display Slide 34.** River Longitudinal Profile (1 min) a. "This slide shows a longitudinal profile of a river." b. "Natural rivers typically develop a profile along their length that curves upward like a dish. This is called a *concave-up longitudinal profile* because the concavity in the curve faces upward. This curve is steepest at its upper end near the headwaters and flattest at its lower end near the drainage outlet." c. "This concave shape forms because of the interaction between gravity and the mass of flowing water and sediment. It reflects the fact that the small headwater tributaries carry less water and sediment and thus require a steeper slope to move that small mass downhill. On the other hand, a large trunk stream carries much more water and sediment in the lower basin and thus only requires a gentle slope to move that greater mass downhill toward the outlet."

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			**Display Slide 35.** Types of River Channels (1 min) a. "Most rivers begin their journey in the mountainous headwaters area of a watershed and flow downward into a valley that leads to a drainage outlet at an ocean, a lake, or another bigger river." b. "As rivers erode their profile, they may either cut their beds downward into hard rock or build their beds upward by depositing sediment. This results in two different types of river channels: a *bedrock channel,* where a river cuts a canyon in the hard rock of a mountain, or an *alluvial channel*, where a river builds up its bed by depositing sediment across a floodplain."
			**Display Slide 36.** Types of Sediment Load (3 min) a. "This slide shows various types of sediment load." b. "River channels carry both water and sediment. The sediment consists of broken particles of weathered rock that have eroded from the surface of the watershed. Fast-flowing river water carries the sediment down a channel and deposits it in another location where the water flow is slower." c. "The *sediment load* of a river is defined as 'the volume or mass of material a river transports in a given amount of time.'" d. "There are three different types of sediment load in a river: (1) suspended load, (2) bed load, and (3) dissolved load." e. "A *suspended load* consists of small grains that are carried aloft by turbulence in the flowing water. These small silt or sand grains turn river water

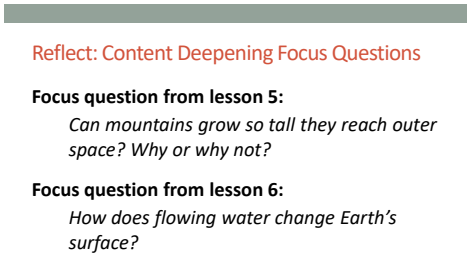
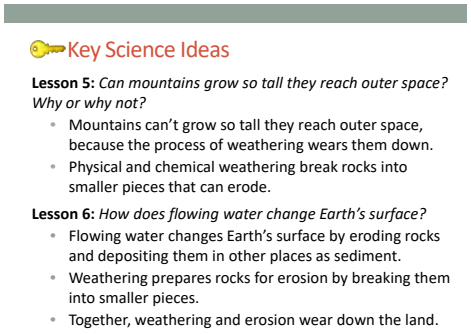
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			brown during a flood." f. "A *bed load* consists of larger, heavier grains that roll, slide, or bounce along the bed as the flowing water carries them along. These are the pebbles and boulders we see on the bottom of a streambed when it's dry." g. "A *dissolved load* consists of ions that dissolve in the flowing water. The chemical weathering of rocks and minerals upstream produce these ions." h. "The physical particles of rock in suspended and bed loads are visible, but the chemical ions of a dissolved load are part of the flowing water and can't be seen with the naked eye."
			**Display Slide 37.** Stream-Channel Erosion: Part 1 (2 min) a. "The equation on this slide illustrates stream-channel erosion." b. "Rivers erode their beds by either removing sediment grains that have accumulated on the bed or by cutting directly into the hard bedrock beneath the sediment. Both of these processes require sufficient sideways force or *shear stress* exerted by the column of flowing water. This *bed shear stress* is proportional to the water depth, or *mass*, and the steepness, or *slope*, of the stream channel." c. "With greater water flow, water depth increases, which means that more mass is pressing down on the streambed. With a steeper stream channel, more of that mass is directed downhill, increasing the sideways force or shear stress on the streambed. So more water and/or a steeper streambed increase erosion." d. "We'll test these ideas later using a stream-table

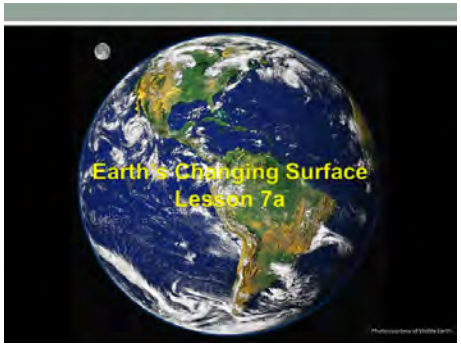
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			model. This type of model can show us how increasing or decreasing water flow and/or changing the tilt of the stream table affect erosion and deposition."
			**Display Slide 38.** Stream-Channel Erosion: Part 2 (2 min) a. "Water depth and channel steepness determine the speed at which river water flows. So flow velocity is also related to a river's ability to erode its bed." b. "The graph on this slide plots water velocity compared against the size of sediment grains that can be lifted off the bed." c. "On the left side of the graph, faster water flow, with deeper water and a steeper channel, is required to move large sediment grains like cobbles and boulders. In the middle, smaller grains, such as grains of sand, can be moved with slower velocities of water, shallower water, and a gentler slope. But on the right side, faster velocities of water are required to move the smallest grains of silt and clay because those grains are sticky or cohesive." d. "So it's hardest for a stream to erode big boulders and sticky clay from its bed, and it's easiest to move small, loose grains of sand."

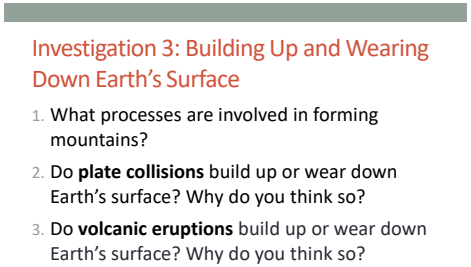
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			**Display Slide 39.** Dynamic Equilibrium and the Graded River (2 min) a. "To better understand river erosion and deposition, we need to understand the important concept of *dynamic equilibrium*." b. "According to this concept, rivers are dynamic systems that respond to changing conditions within the watershed. As plate tectonics build up Earth's surface and erosion wears it down, rivers respond by adjusting their profile to achieve a balance between opposing forces. If any characteristic of a river changes, such as its channel shape or the flow of water and sediment, other characteristics will adjust to achieve a new balance or equilibrium. The dish-shaped profile we discussed earlier is an expression of dynamic equilibrium." c. "Geomorphologists refer to this balanced form as a *graded river profile*. A graded river is a river in equilibrium or balance with the prevailing conditions in the watershed."
			**Display Slide 40.** Lane's Balance Equation (1 min) a. "Four basic parameters control river equilibrium: (1) sediment load (L), (2) average sediment grain size (D_{50}), (3) channel slope (S), and (4) water flow or discharge (Q)." b. "The equation on the slide, called *Lane's balance*, is a mathematical relationship that expresses this equilibrium. L x D_{50} is proportional to S x Q." c. "If any of these four parameters is altered, the other three will adjust to achieve a new balance or equilibrium."

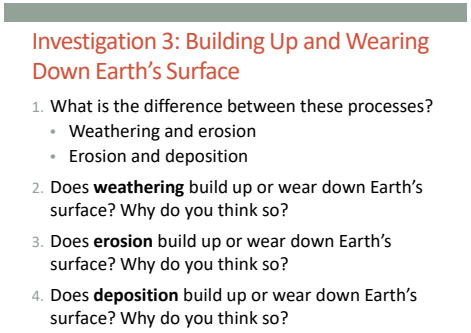
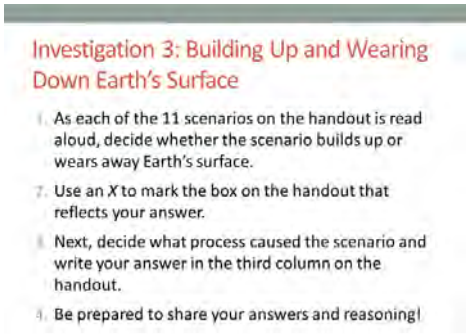
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			**Display Slide 41.** Graded River Profile (1 min) a. "This photo of Death Valley, California, is an excellent example of a graded stream. The stream channel follows a concave-up graded profile from its head on the mountainside to its base on the alluvial fan." b. "Scarps, or steep slopes, are visible at the base of the hill, and with repeated earthquakes on the mountain-front fault, the mountain block rises and the valley bottom drops down. To maintain an equilibrium-graded profile, the stream erodes its bed upstream, cutting a deeper canyon into the rock, and deposits sediment downstream, building up its bed on the alluvial fan." c. "Think about how this relates to your observations during our stream-table investigation."
			**Display Slide 42.** Earth's Changing Surface: Lesson 6b (Less than 1 min) a. "Next, we'll explore science ideas about Earth's changing surface from lesson 6b."

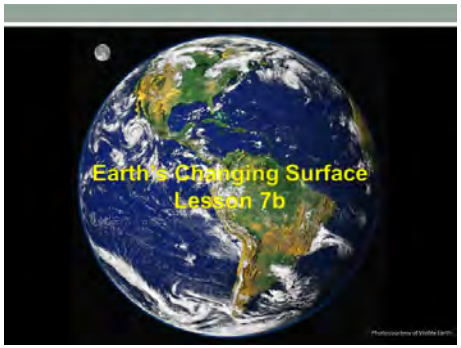
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			**Display Slide 43.** Content Deepening: Focus Question 1 (Less than 1 min) a. Review the focus question on the slide. b. Emphasize that this question from ECS lesson 6a will guide student learning throughout lesson 6b as well.
			**Display Slide 44.** Investigation 2: Stream Tables and Real Streams (5 min) a. **Pairs:** "Examine these two photographs of a stream-table model juxtaposed with a real stream and discuss with an elbow partner how the model compares with a real stream. See if you can come up with three similarities and three differences. Then write your ideas in your science notebooks."
			**Display Slide 45.** Investigation 2: Stream Tables and Real Streams (10 min) a. Read the first two questions on the slide. b. Call on pairs to share their ideas for answering these questions, citing the similarities and differences they recorded in their notebooks to support their answers. Probe participants' responses and elicit differing points of view. c. Then read the third question on the slide and invite

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			several participants to share their ideas. Probe and challenge their responses.
			**Display Slide 46.** Reflect: Content Deepening Focus Questions (10 min) a. "As we reflect on the content deepening focus question from ECS lesson 6, let's revisit the focus question from lesson 5 as well. Think about how today's investigations answer both questions." b. Review the focus questions on the slide. c. "To answer these questions, make a claim and support it with evidence and reasoning from today's investigations." d. "As others share their claims, listen carefully and be ready to agree, disagree, ask questions, or add on. Make sure to support your arguments using evidence and reasoning from today's investigations." e. During this discussion, record key ideas on chart paper.
			**Display Slide 47.** Key Science Ideas (5 min) a. Review the key science ideas on the slide that answer the focus questions from ECS lessons 5 and 6. Emphasize that participants' observations and evidence from today's investigations helped shape these responses. b. **Whole-group discussion:** "Does everyone agree with these ideas? Would you like to add or revise anything?" c. Ask participants to copy these ideas into their science notebooks under the focus questions for

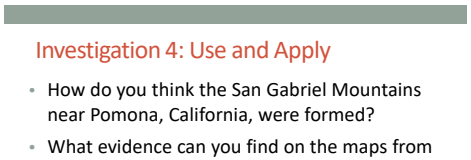
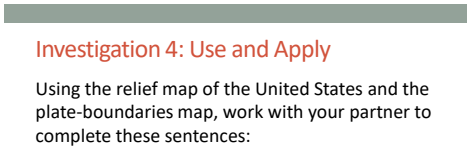
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			lessons 5 and 6.
			**Display Slide 48.** Earth's Changing Surface: Lesson 7a (Less than 1 min) a. "Now we'll explore science ideas about Earth's changing surface from lesson 7a."
		Content Deepening: Focus Question 2 How can we use what we've learned about Earth's changing surface to answer the unit central questions?	**Display Slide 49.** Content Deepening: Focus Question 2 (Less than 1 min) a. Read the focus question on the slide. b. "This question will guide student learning throughout ECS lesson 7a." c. Have participants write this question in their science notebooks and draw a box around it.
		Unit Central Questions Why isn't all of Earth's surface flat? What causes the surface to look different in different places?	**Display Slide 50.** Unit Central Questions (Less than 1 min) a. Review the unit central questions on the slide and remind participants that these questions will guide student learning throughout the entire series of ECS lessons. b. Explain that the purpose of lesson 7 is for students to summarize what they've learned about Earth's changing surface throughout the unit and develop

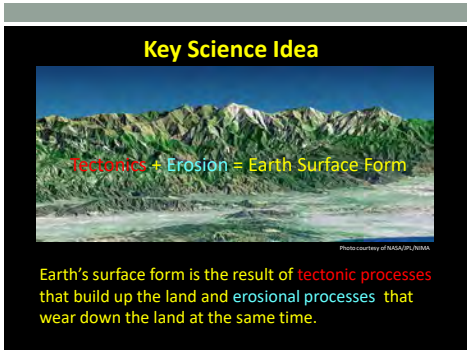
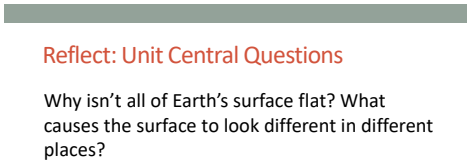
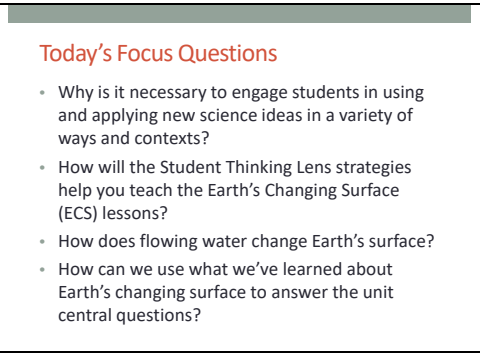
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			answers for these questions.
			**Display Slide 51.** Investigation 3: Building Up and Wearing Down Earth's Surface (Less than 1 min) a. "For our next investigation, you'll work with your partner to answer a series of questions about the processes that build up and wear down Earth's surface."
			**Display Slide 52.** Investigation 3: Building Up and Wearing Down Earth's Surface (10 min) a. Have participants pair up with their elbow partners. b. "The questions on this slide focus on the processes involved in building up Earth's surface." c. **Pairs:** "Discuss these questions with your partners and write your answers in your science notebooks."

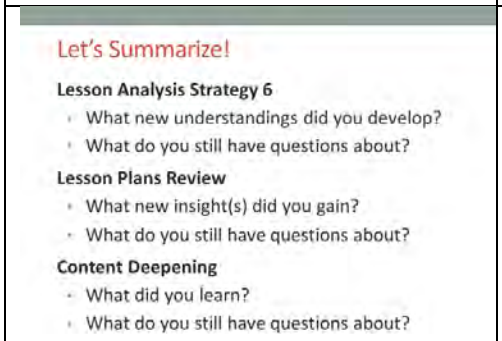
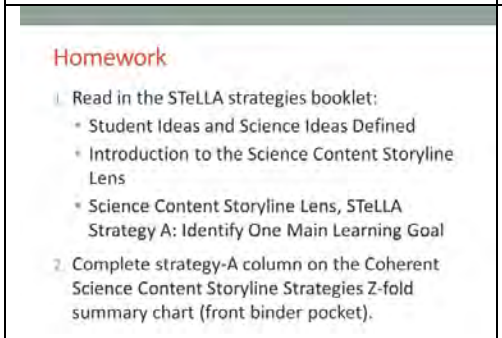
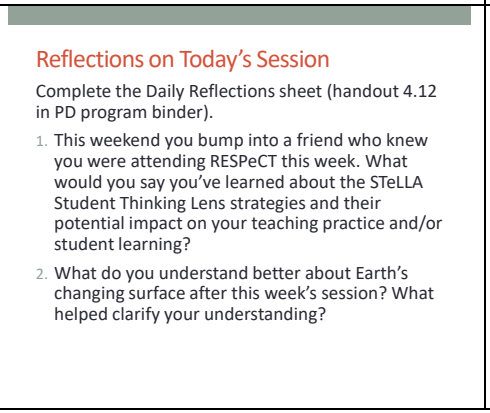
PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			**Display Slide 53.** Investigation 3: Building Up and Wearing Down Earth's Surface (10 min) a. "The questions on this slide relate to weathering, erosion, and deposition. Think about whether these processes are involved in building up or wearing down Earth's surface." b. **Pairs:** "Discuss these questions with your partners and write your answers in your science notebooks."
			**Display Slide 54.** Investigation 3: Building Up and Wearing Down Earth's Surface (15 min) a. Distribute handout 4.11 (Building Up and Wearing Down Earth's Surface). b. Inform participants that they'll work independently on this activity. c. Walk participants through the instructions on the slide and ask if they have any questions. d. Read the scenarios on the handout one at a time. Give participants about 30 seconds to think about their answers and record them on the handout. e. **Whole group:** Read through each scenario again and direct participants to indicate their answers to the following questions with a show of hands: • "How many think this is an example of building up Earth's surface?" • "How many think this is an example of wearing down Earth's surface?" • "What is the cause of each scenario? What process is involved?"

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			f. Record participants' answers on chart paper and reach a consensus on each scenario.
			**Display Slide 55.** Earth's Changing Surface: Lesson 7b (Less than 1 min) a. "For our final investigation, we'll explore ideas about Earth's changing surface from lesson 7b."
		Content Deepening: Focus Question 2 How can we use what we've learned about Earth's changing surface to answer the unit central questions?	**Display Slide 56.** Content Deepening: Focus Question 2 (Less than 1 min) a. Review the focus question on the slide. b. Emphasize that this question from ECS lesson 7a will guide student learning throughout lesson 7b as well.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			**Display Slide 57.** Unit Central Questions (Less than 1 min) a. Review the unit central questions on the slide.
			**Display Slide 58.** Investigation 4: Use and Apply (1 min) a. Have participants pair up with their elbow partners again. b. "The image on this slide is a digital topographic model of the San Gabriel Mountains that rise above Pomona." c. "This investigation will focus on the processes that shape these mountains." d. Ask participants to think about the question on the slide.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			**Display Slide 59.** Investigation 4: Use and Apply (15 min) a. Have participants locate ECS handouts 4.1 (Map of Plate Boundaries around the World) and 4.2 (Physical Map of the World) in their lesson plans binders. b. Read the questions on the slide. c. **Pairs:** "Discuss your ideas for answering these questions with your partners. Then write your answers in your science notebooks." d. **Whole group:** Invite pairs to share their ideas and evidence with the group. Probe participants' responses and elicit differing points of view.
			**Display Slide 60.** Investigation 4: Use and Apply (15 min) a. Distribute a plastic relief map of the United States (from ECS lesson 1a) to each pair of participants. b. Inform participants that they'll also need handout 4.1 (Map of Plate Boundaries around the World) for this investigation. c. Read through the instructions and statements on the slide. d. **Pairs:** "Work with your partners to develop answers for each statement. Then record your responses in your science notebooks and include drawings to support your ideas."

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
			**Display Slide 61.** Key Science Idea (1 min) a. "Throughout our content deepening sessions this week, we've been developing one key science idea: 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." b. Remind participants that this idea is the fundamental theme behind the ECS unit.
			**Display Slide 62.** Reflect: Unit Central Questions (5 min) a. "Based on everything we've learned this week about Earth's changing surface, how would you answer our unit central questions?" b. Invite several participants to answer these questions using one-sentence statements. c. After participants have shared their answers, ask the group if they would like to add or change anything.
3:15–3:30 15 min **Wrap-Up: Summary, Homework, and Reflections**	**Purpose** • Summarize and reflect on key ideas from today's learning and preview the transition to the Science Content Storyline Lens (SCSL) strategies. **What Participants Do** • Review today's focus questions. • Share key ideas from the lesson analysis (strategy 6), lesson plan		**Display Slide 63.** Today's Focus Questions (2 min) a. Review today's focus questions. b. **Individual think time (1 min):** Ask participants to reflect on these questions and think about how they might revise their answers.

PD Model: Time/Phase	Purpose, Content, and What Participants Do	Slides	Process
Slides 63–66	review, and content deepening work. • Copy down the homework assignment. • Write their reflections on today's learning. **Handouts in PD Binder** • 4.12 Daily Reflections—Day 4 **Supplies** • Science notebooks		**Display Slide 64.** Let's Summarize! (5 min) a. **Individual think time (1 min):** Give participants a minute to think about the questions on the slide and consider questions they still have. Challenge them to formulate a statement summarizing what they learned in each area. b. **Whole-group share-out:** Have participants share at least two different statements about each of the areas on the slide. Elicit more if time allows.
			**Display Slide 65.** Homework (3 min) a. "Next week we'll focus on the Science Content Storyline Lens strategies and explore a new content area: energy transfer. To prepare, complete the homework tasks on the slide." b. Make sure participants copy the assignment into their science notebooks.
			**Display Slide 66.** Reflections on Today's Session (5 min) a. Give participants time to reflect on today's session and write their responses to the questions on the Daily Reflections sheet (handout 4.12 in PD program binder).