**SSUP: Summer Institute PD Leader Guide Day 3 Sun’s Effect on Climate and Seasons**

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| Grade Level | 5 | Day | 3 | STeLLA Strategies Focus | SCSL A, B, I; STL 9 | Subject Matter Focus | Sun’s Effect on Climate and Seasons |
| Teacher Learning Goals | * Average temperatures are higher in the northern hemisphere in Jun-July because the northern hemisphere receives more direct sunlight as it orbits the sun and lower in the southern hemisphere in Dec-Jan because it gets lets direct sunlight. * For a strong and focused science content storyline, it is important to have just one main learning goal. The main learning goal and focus question set the lesson purpose and organize the entire lesson. * Identifying one main learning goal, setting the lesson purpose with a focus question, and relating the summary activity to the learning goal creates greater lesson coherence. * Analysis of the main learning goal should assess its importance as a big idea in science, its appropriateness for challenging student thinking, its scientific accuracy, and whether it addresses common student misconceptions. | | | | | | |
| Focus Questions | * Why is one main learning goal (SCSL Strategy A) essential for coherence of the Science Content Storyline? * How does the use of a focus question (SCSL Strategy B) contribute to the coherence of the Science Content Storyline? * How does synthesizing and summarizing key science ideas (SCSL I/STL 9) contribute to the coherence of the science content storyline? * How can we begin and end a lesson using STeLLA Strategies? * Why is it warmer in the summer than in the winter? | | | | | | |
| Ideal Teacher Response | Why is one main learning goal (SCSL Strategy A) essential for coherence of the Science Content Storyline?  One main learning goal provides the focus for all the other STeLLA strategies and decreases the likelihood of distracting ideas. It is intended for use by the teacher in planning, enacting, and reflecting on lessons. The main learning goal is a big idea in science and is foundational to coherence.  How does the use of a focus question (SCSL Strategy B) contribute to the coherence of the Science Content Storyline?  The purpose served by the main learning goal for teachers, is similarly served by the focus question (matched to the main learning goal) for students. The sequence of the focus questions across a unit of instruction should be just as strong as the sequence of main learning goals.  How does synthesizing and summarizing key science ideas (SCSL I/STL 9) contribute to the coherence of the science content storyline?  Synthesizing and summarizing key science ideas by either or both the students and teacher closes the lesson with a focus on a few key science ideas.  How can we begin and end a lesson to help students develop a coherent science content storyline?  The use of a focus questions and a synthesize/summarize task or statement moves teachers and learners away from “activity-mania” and toward attention to the goal and intent of the lesson. Together, these strategies help teachers “begin with the end in mind”.  Why is it warmer in the summer than in the winter?  As Earth orbits the Sun in a nearly circular orbit, its axis always tilts in the same direction. Earth’s consistent tilt causes the Northern Hemisphere to lean toward the Sun at certain times of year, specifically during June, July, and August, and away from the Sun at other times of the year—during the months of December, January, and February. Earth’s Northern Hemisphere experiences summer when it leans toward the Sun while the Southern Hemisphere experiences winter. Conversely, Earth’s Southern Hemisphere experiences summer in when it leans toward the Sun while the Northern Hemisphere experiences winter. (Note that the seasonal variations that we call summer and winter do not occur at latitudes close to the equator.) When Earth’s hemispheres lean neither toward nor away from the Sun along Earth’s orbit, we experience spring and fall. | | | | | | |

| Preparation | Materials | Videos and Transcripts |
| --- | --- | --- |
| **Planning/Preparation Tasks:**   * Study PDLG, PPTs, video clips, and handouts. Make changes to PPTs, if needed. * Link clips * Prep Lesson 3-4 materials   **Daily Set Up Tasks:**   * Check that video clips are correctly linked to PPT * Set up PowerPoint and speakers * Check video & sound * Arrange furniture, food (include social distancing protocols in set up) * Arrange posters/charts   **Day 1 Set Up Task:**  Arrange teacher materials on tables:   * Tabletop name cards * STeLLA strategies booklet * SSUP PD binder   **Daily Follow-up Tasks:**   * Archive final PPT * Collect and turn in daily feedback * Disinfect common materials, tables and common areas per protocol | **Posters/Charts**:   * STeLLA Conceptual Framework * Day 3 Agenda chart * Program Goals chart * Norms chart * Focus Questions chart * Effective Science T&L charts * Parking Lot * Purpose/Key Features (A, B, I/9) prepped for whole group   **Handouts in SSUP PD binder front pocket**:   * Z-fold chart: Student Thinking Lens Strategies * Z-fold chart: Science Content Storyline Strategies   **Handouts in SSUP PD binder, Tab 3**   * Walk-about-Review * Candidate Main Learning Goals * SCSL Strategy A: Analysis Guide * Candidate Focus Questions * SCSL Strategy B: Analysis Guide * Transcript Classroom (A)\_Mawlawi * Transcript Classroom (B, I/9): SSUP\_Charles\_G5\_SEC\_L2\_C1-3 * Day 3 Daily Reflection sheet * Science Content Cut Sheet * Position of Earth around Sun   **Supplies:**   * 1 set/team: Globe, bulb/base/extension cord & powerstrip, Styrofoam ball, dowel, base, hula hoop, 2 push pins, rubber band * 1 North star cut out   **Resources:**   * STeLLA Strategies booklet * BSCS Journal * Science Notebook * MLG/FQ Card Set | **Classroom Clip (A): Mawlawi\_SECL2\_Strategy A**  In this clip, the teacher presents the focus question and then talks with a student about question he has about day/night. She asks him to hold his question until next week.  **Classroom Clip (B, I/9) SSUP\_Charles\_G5\_SEC\_L2\_C1-3**  This clip, the teacher reminds students of the Unit Central question and calls on students to recall what was learned from the previous lesson. She then introduces them to the lesson focus question. At the end of the lesson, after reminding students of the lesson's focus questions, the students are asked to complete a hand-out with sentence stems to summarize their answers to the focus. Finally, the teacher begins to summarize the science ideas learned from the activities of the day. |

**DAY 3 SESSION OUTLINE: 8:30 a.m. – 4:30 p.m.**

| **Time** | Purpose | Content | **Activities** |
| --- | --- | --- | --- |
| 8:30 – 9:05  35 min  Slides 1-7 | **Purpose:** The purpose of the opening is to continue to build community and set the stage for today’s learning, in part by customizing the norms. | **Content:**Focus Questions   * Why is one main learning goal (SCSL Strategy A) essential for coherence of the Science Content Storyline? * How does the use of a focus question (SCSL Strategy B) contribute to the coherence of the Science Content Storyline? * How does synthesizing and summarizing key science ideas (SCSL I/STL 9) contribute to the coherence of the science content storyline? * How can we begin and end a lesson using STeLLA Strategies? * Why is it warmer in the summer than in the winter? | **Opening**   * Day 2 Reflections * Goals/Agenda * Norms * FQs * Reconnection |
| 9:05 – 9:50  45 min  Slides 8-9 | **Purpose:** The purpose of this session is to develop a shared understanding of STeLLA Strategies A, B, I/9: one main learning goal, focus questions, and synthesize/summarize and summarizing key ideas. | **Content:** One main learning goal provides the focus for all the other STeLLA strategies and decreases the likelihood of distracting ideas. It is intended for use by the teacher in planning, enacting, and reflecting on lessons. The main learning goal is foundational to coherence.  The purpose served by the main learning goal for teachers, is similarly served by the focus question (matched to the main learning goal) for students. The sequence of the focus questions across a unit of instruction should be just as strong as the sequence of main learning goals. | **Lesson Analysis: Strategies A, B, I/9**   * Charting |
| 9:50 – 10:00 | **Break /Transition** | |  |
| 10:00 – 11:45  105 min  Slides 10-17 | **Purpose:** The purpose of this session is to develop a shared understanding of STeLLA Strategies A, B, I/9: one main learning goal, focus questions, and synthesize/summarize and summarizing key ideas. | **Content:** One main learning goal provides the focus for all the other STeLLA strategies and decreases the likelihood of distracting ideas. It is intended for use by the teacher in planning, enacting, and reflecting on lessons. The main learning goal is foundational to coherence.  The purpose served by the main learning goal for teachers, is similarly served by the focus question (matched to the main learning goal) for students. The sequence of the focus questions across a unit of instruction should be just as strong as the sequence of main learning goals.  The use of a focus question and synthesize/summarize task or statement moves teachers and learners away from “activity-mania” and toward attention to the goal and intent of the lesson. Together, these strategies help teachers “begin with the end in mind”. | **Lesson Analysis: SCSL Strategies A, B, I/9**   * Lesson Analysis/Analysis Guides * Card sort |
| 11:45 – 12:15 | **Lunch** | |  |
| 12:15 – 1:50  95 min  Slides 18-26 | **Purpose:** The purpose of this session is to develop a shared understanding of STeLLA Strategies A, B, I/9: one main learning goal, focus questions, and synthesize/summarize and summarizing key ideas. | **Content:** The use of a focus question and synthesize/summarize task or statement moves teachers and learners away from “activity-mania” and toward attention to the goal and intent of the lesson. Together, these strategies help teachers “begin with the end in mind”. | **Lesson Analysis: SCSL Strategies B, I/9**   * Clip 1: Mawlawi\_SECL2\_Strategy A * Clip 2: (B, I/9): SSUP\_Charles\_G5\_SEC\_L2\_C1-3 * Meta moment |
| 1:50 – 2:00 | **Break** | |  |
| 2:00 – 4:10  140 min  Slides 27-36 | **Purpose:** The purpose of this session is to model effective STeLLA-based science teaching and learning through a common experience that is grounded in a 3D, phenomena/program driven unit and designed for adult learners. | **Content:** STeLLA model lessons/units attend to the characteristics of effective science teaching and learning (e.g., 3D, phenomenon/problem-driven, student-centered, make student thinking visible and support sense-making, coherent, and access/engage PK and develop metacognitive abilities).  The content deepening experience will include explicit modeling and use of elicit, probe, and challenge questions.  As Earth orbits the Sun in a nearly circular orbit, its axis always tilts in the same direction. Earth’s consistent tilt causes the Northern Hemisphere to lean toward the Sun at certain times of year, specifically during June, July, and August, and away from the Sun at other times of the year—during the months of December, January, and February. Earth’s Northern Hemisphere experiences summer when it leans toward the Sun while the Southern Hemisphere experiences winter. Conversely, Earth’s Southern Hemisphere experiences summer in when it leans toward the Sun while the Northern Hemisphere experiences winter. (Note that the seasonal variations that we call summer and winter do not occur at latitudes close to the equator.) When Earth’s hemispheres lean neither toward nor away from the Sun along Earth’s orbit, we experience spring and fall. (Note: This content will be continued in Day 3.) | **Content Deepening:**  **Lessons 3 & 4**   * Teacher Set-up * Common Experience * Teacher Follow-up |
| 4:10 - 4:30  20 min  Slides 37-42 | **Purpose:** The purpose of the closing is to continue to build community, reflect on the day, and set the stage for tomorrow’s learning. | **Content:**Focus Questions   * Why is one main learning goal (SCSL Strategy A) essential for coherence of the Science Content Storyline? * How does the use of a focus question (SCSL Strategy B) contribute to the coherence of the Science Content Storyline? * How does synthesizing and summarizing key science ideas (SCSL I/STL 9) contribute to the coherence of the science content storyline? * How can we begin and end a lesson using STeLLA Strategies? * Why is it warmer in the summer than in the winter? | **Closing**   * Revisit Focus Questions * Day 3 Reflection Sheet * Homework |

**DAY 3 Session Detail**

| **Time and Focus** | **Purpose and Content & What Participants Do** | **Slides** | **Process** |
| --- | --- | --- | --- |
| 8:00 – 8:30 | **Coffee & Conversation** |  | Need several hands on deck to help participants complete paperwork, registration and logistics. Remind participants that we’ll begin in the whole group for Day 3. They will need their Z-folds, STeLLA Strategies Booklet, the Walk-about-Review HO (p.\_\_) from their PD binder, a writing utensil, and a few 3X3 sticky notes. |
| 8:30 - 9:05  35 min  Slides 1-7 | **Opening**  **Purpose:** The purpose of the opening is to continue to build community and set the stage for today’s learning  **Content**  Focus Questions:   * Why is one main learning goal (SCSL Strategy A) essential for coherence of the Science Content Storyline? * How does the use of a focus question (SCSL Strategy B) contribute to the coherence of the Science Content Storyline? * How does synthesizing and summarizing key science ideas (SCSL I/STL 9) contribute to the coherence of the science content storyline? * How can we begin and end a lesson using STeLLA Strategies? * Why is it warmer in the summer than in the winter?   **What participants do**  Participants reflect on learning from both days 1, 2 and 3 using the Walk-about-Review. Participants chart and revise their thinking about STeLLA Strategies A, B, and I/9.   * SCSL Strategy A: Identify one main learning goal * SCSL Strategy B: Set the purpose with a focus question * SCSL Strategy I: Summarize key science ideas * STL Strategy 9: Engage students in making connections by synthesizing and summarizing key science ideas.   **Resources**   * Journals * Posters   + STeLLA Conceptual Framework Poster   + Norms poster * PD Binder   + Walk-about-Review HO p. \_\_ * Charts   + Day 3 Agenda   + Focus Questions   + Parking Lot   + Effective Science T&L   + SCSL A, B, I/9 Purpose/Key Features   + Program Goals chart |  | 1. **SSUP Program Day 3 (0 min)** 2. Greet participants as they enter the room. Help them pick up their materials and find their spots. |
|  | 1. **Day 2 Reflections (5 min)** 2. Share patterns in the Day 2 reflections. Link to goals and agenda for today where possible. 3. Link back to the role of content in questioning in light of a good night’s sleep and their homework: What role does content knowledge and SCSL A, B, I/9 play in a teachers’ ability to ask good elicit, probe and challenge questions? Invite participants to share with a partner who is NOT in their study group. Then have each pair share with another pair. 4. Check parking lot for questions and respond as appropriate. 5. Direct participants to the daily reflections sheet (PD Binder p.\_\_). Explain that we will be collecting these reflections again at the end of the day. Invite participants to add thoughts and ideas to their reflection sheet throughout the day. |
|  | 1. **STeLLA Program Goals (5 min)** 2. Share program goals. Link as appropriate to reflections. 3. Ask participants to review their notes on the program goals from yesterday and reflect on their progress. What program goals do they feel they have made progress? What goals need more attention? 4. Invite participants to add a few more ideas in their notebook. |
|  | 1. **Week at a Glance (0 min)** 2. Point to the Day 3 agenda chart and link the agenda to the program goals. |
|  | 1. **STeLLA Norms (5 min)** 2. Remind participants of the importance of community and how the STeLLA norms support our work together. Note that we’ll continue to attend to the spirit of the norms in the whole group. Note that each team revised their norms to better support their collaboration.   **Transition:** *We’ve not had an opportunity to spend time in our whole cohort since we took a look at the research base of the STeLLA Conceptual Framework—the Student Thinking Lens and the Science Content Storyline Lens—as we considered the TIMSS Video Study and the findings from How People Learn and How Students Learn Science in the Classroom.* |
|  | 1. **Walk-about Review (15 min)** 2. Provide instructions for the task. Remind participants the reflections can be drawn from any of the learning experiences over the past two day. 3. Offer up to 2 min. for individuals to record their recollections, insights, and applications in column 1. Let them know they should be prepared to share their ideas. 4. For the next 5 min, they will “walk about” to share ONE of their recollections, insights, OR applications and record ONE recollection, insight, OR application from another person. in columns 2 and 3 along with the name of the person who shared the idea. 5. At the conclusion of the time, whip around and gather a few key ideas from the group. |
|  | 1. **Day 3 Focus Questions (5 min)** 2. Share the Day 3 focus questions **(strategy-focused only).**   **Transition:** *To begin to answer these questions, we’ll dig into the homework from yesterday as we transition to the Science Content Storyline Lens [ADVANCE SLIDE] and strategies A, B, I/9.* |
| 9:05 - 9:50  45 min  Slides 8-9 | **Lesson Analysis**  **Purpose:** The purpose of this session is to consider effective strategies to begin and end a lesson by developing a shared understanding of STeLLA Strategies A, B, & I/9.  **Content:** The Science Content Storyline Lens focuses teacher and students on the sequence of science ideas that build a coherent story about the big idea of the unit. Each lesson should have one main learning goal (SCSL A): a big idea that students are expected to learn showing the relationship among science ideas and used to explain phenomena.  While the main learning goal for a lesson is for teachers, students’ attention to the purpose for the lesson is established and maintained by the lesson focus question (SCSL B). Students return to the focus question throughout the lesson to revise their thinking and maintain focus on the lesson’s purpose.  SCSL I/STL 9 conclude a lesson with either a task (STL 9) or teacher summer (SCSL I) to ensure a focus on key science ideas and consistent with the main learning goal (SCSL A) and focus questions (SCSL B).  **What participants do**  Participants work together in their teams and across teams to begin to develop shared understanding of the identified STeLLA strategies.  **Resources**   * Posters   + STeLLA Conceptual Framework poster   + Norms Poster   + STeLLA Strategies Booklet & Z-folds * Charts   + SCSL A, B, I/STL 9 Purpose/Key Features * Additional Resources   + Chart paper & markers for each team   + A few sticky notes/person |  | 1. **Conceptual Framework** **(5 min)** 2. Highlight the SCSL/STL strategies from the homework assignment. |
|  | 1. **SCSL Strategies A, B, I/9 (40 min)**  PDL Note: The slide provides an example of the charts that study group members will create.Divide each study group into 4 groups and assign one strategy (A, B, I, 9) to each group. Remind participants:Purpose: why the strategy is importantKey features: characteristics that distinguish the strategy from othersFocus on the text; if the idea is not in the strategy document, it doesn’t go on the chart.  * 1. Remind participants that our goal is shared understanding, so…if it is not in the summary doc, it doesn’t go on the chart.   2. After charts are completed, invite participants to review the chart for their assigned strategy developed by at least one other team. They should use sticky notes to ask clarifying questions and pose wonderings about ideas that might be missing or where ideas came from in the strategy doc. If there’s time, they can review the chart for their assigned strategy developed by other teams.   3. When groups return to their own charts, they should use the information gathered and feedback to clarifications to revise charts as needed.   4. Whip around and gather a few examples of changes that teams made to their charts.   5. If participants don’t ask, then be sure to raise the question of the relationship between a focus question and an elicit question. Refer back to Strategy Booklet.      1. FQ is at the lesson level. An elicit question may be of that grain size.      2. FQs are revisited throughout a lesson and perhaps across lessons to help students develop the intended science content storyline.      3. Elicit questions may be asked at any time and serve to uncover students’ current thinking about a particular science idea, focus question, or experience.   **PDL Note:** As teams are working, move around to each group and ask questions such as:   * *What do you mean by…?* * *Where did you see that in the text?*   Pay attention to ideas on the charts that need to be probed and challenged during the whole group conversation. Some of these ideas will be made visible to everyone by the prompts on the next two slides.  Note the relationship between science ideas and student ideas as appropriate. If not appropriate here, the content of the HW reading will come up later in the session.  Highlight: A (for teacher) and B (for students) similar to how 9 (for students to syn/summ) and 9 (for Ts) |
| 9:50 – 10:00 | **Break:** Transition/take charts | | |
| 10:00 -11:45  105 min  Slides 10-17 | **Purpose:** The purposes of this session are to 1) develop a shared understanding of STeLLA Strategies A and B: Identify one main learning goal and set the purpose with a focus question, and 2) deepen abilities to analyze a lesson are deepened through use of analysis guides.  **Content:** Analysis guides provide criteria used to evaluate the strengths of main learning goals and focus questions. While the main learning goal is for teachers and the focus question for students, they must be closely matched to support student construction of a coherent science content storyline. The focus question serves as a guide for student learning without giving away the “punchline” of the lesson.  **What participants do**  In content-specific study groups, participants consider candidate main learning goals and focus questions in light of the analysis guides, then match main learning goals to focus questions.  **Resources**   * Posters   + STeLLA Conceptual Framework * Charts   + Purpose/Key Features for A, B, I/9 * PD Binder   + MLG AG (p. \_\_)   + Candidate MLGs (p. \_\_)   + FQ AG (p. \_\_)   + Candidate FQs (p. \_\_)   + SCSL I/STL 9 AG (p. \_\_) * STeLLA Strategies Booklet |  | 1. **STeLLA Conceptual Framework (0 min)** 2. Orient participants to the Conceptual Framework and note that we’ll continue our study of the science content storyline lens with a focus on Strategies A and B during this session.   **Transition:** Note that one difference between Student Thinking Lens Strategies and strategies in the Science Content Storyline is the use of analysis guides to help us think through quality. |
|  | 1. **Analysis Guides: MLG (15 min)**   **PDL Note:** The slide is animated. The first section provides general features of analysis guides.   * 1. General characteristics of analysis guides include questions, a graphic organizer or space to capture information, and often prompts to strengthen the artifact being analyzed.   2. Refer participants to the MLG Analysis Guide (PD Binder p. \_\_). Provide a few minutes to study the questions. Ask them to consider how they would answer these questions if the candidate MLG was a GOOD example. Invite them to turn to a partner and discuss and be ready to ask clarifying questions.   3. Highlight that MLGs include multiple science ideas and we need to be able to parse those out. Invite participants to turn in their Strategy Booklet to pp. 7-8 and read about Student Ideas and Science Ideas. As they read, they should consider the connections among this text, the text in the main learning goal summary document (pp, \_\_\_), and in the MLG Analysis Guide.   4. Whip around and gather ideas from the group. Listen for the following ideas to highlight.      1. MLGs are bigger ideas than science ideas.      2. The MLG is supported by multiple science ideas.      3. Students link multiple science ideas to understand the main learning goal.      4. Science ideas range in grain size—some are big ideas (more concept-like) and some are smaller ideas (more fact-like)      5. Science ideas are accurate, student ideas may not be. Student ideas are their ideas which may be incomplete, naïve, or inaccurate.   **PDL Note:** Using the Analysis Guides will help participants develop a common understanding of A, B, I/9. Encourage teachers to add to their Z-folds!  **Transition:** *Let’s take a look at some candidate main learning goals. You’ll use our conversation about examples and non-examples along with this new STeLLA tool to help you make decisions and justify your ideas.* |
|  | 1. **Candidate Main Learning Goals (40 min)**   **PDL Note:** This slide is animated. The animation helps study group members hone in on good examples by eliminating low hanging fruit ***first***. Review the animation to see if you want to use this process. If so,   * Which are easy to eliminate and why?   + Topic (#1)   + Question (#5) * What do you think about #2? (activity) * Are there any candidates on the list that are inaccurate? * What does that leave us? What do you think?  1. Provide a few minutes for participants to consider the candidate MLGs individually. 2. Ask the sequenced questions above using the slide animation as participants respond. Be sure to ask what others think before revealing the “answer.”   **ANSWER KEY**   * 1. No. Topic   2. No. Activity   3. Yes.   4. No. Inaccurate   5. No. Question   6. No. Inaccurate   7. Yes.  1. Now that we’ve identified candidate statements 3 and 7 as MLGs, let’s choose one (#7) to unpack and identify supporting science ideas. 2. Provide a few minutes for participants to generate science ideas for MLG candidate #7. 3. Invite them to share a few of their ideas with a partner. Ideas you might expect to hear include:    1. Average temperatures are higher near the equator than at the poles.    2. Sunlight strikes Earth’s surface near the equator more directly than near the poles.    3. Earth is a sphere so sun rays that are parallel (think flashlight) strike the surface at different angles.    4. Notice that candidate #3 COULD be a MLG and it includes science ideas needed for #7. Remember...grain size! 4. Follow up with a question about why it’s important that we identify science ideas that are part of MLGs?   **Transition:** *Now that we’ve used an analysis guide to consider SCSL Strategy A: Identify one main learning goal, we’ll continue to use analysis guides to think about SCSL Strategy B: Set the purpose with a focus question to think more about the role of focus questions in developing lessons that allow students to construct a coherent science content storyline.* |
|  | 1. **Analysis Guide: FQ (5 min)**   **PDL Note:** The slide is animated. The first section provides general features of AGs.   * 1. Refer participants to the FQ Analysis Guide (PD Binder p. \_\_). Provide a few minutes to study the questions. Ask them to consider how they would answer these questions if the candidate FQ was a GOOD example. Invite them to turn to a partner and discuss and be ready to ask clarifying questions.   2. Advance the slide to emphasize the importance of knowing the MLG in determining the quality of the FQ.   3. Share the second question that links SCSL Strategies B and I/9.   **PDL Note:** Encourage teachers to add to their Z-folds.  **Transition:** *Let’s apply the analysis guide to some candidate focus questions.* |
|  | 1. **Candidate Focus Questions (20 min)**   **PDL Note:** This process will be similar to the one we used with candidate MLGs.   * 1. Refer participants the candidate focus question handout in their PD Binder (p. \_\_).   2. Share instructions for the task.   **Transition:** Build on the ideas shared by the group about why the MLG has to be recorded at the top of the FQ Analysis Guide. *You’ve considered candidate MLGs and FQs. Now, we’ll take a look at the match between these two strategies.* |
|  | 1. **SCSL Strategies A and B (15 min)**    1. Provide instructions for the task.    2. See scope and sequence for the answer key |
|  | 1. **Analysis Guide SCSL B & I/9 (5 min)**    1. Introduce the I/9 Analysis Guide.    2. Provide instructions for the task.    3. Note that we’ll use this analysis guide later in the session.   **PDL Note:** Encourage teachers to add to their Z-folds! |
|  | 1. **Meta Moment (5 min)** 2. Provide instructions for the task. 3. Be sure the probe the relationship (similarities and differences) between SCSL Strategies A and B.   **Transition:** *We’ll continue to refine our understanding of SCSL strategies A (MLG) and B (FQ) I/9 (Synthesize/Summarize) by analyzing our experiences in content deepening.* |
| 11:45 - 12:15 | **Lunch** | | |
| 12:15 – 1:50  95 min  LA C1 (40 min)  LA C2 (45 min)  Slide 18-26 | **Purpose:**The purposes of this session are to 1) develop a shared understanding of STeLLA Strategies A and B: Identify one main learning goal and set the purpose with a focus question, and 2) deepen abilities to analyze a lesson are deepened through use of analysis guides.    **Content:**Analysis guides provide criteria used to evaluate the strengths of main learning goals and focus questions. While the main learning goal is for teachers and the focus question for students, they must be closely matched to support student construction of a coherent science content storyline. The focus question serves as a guide for student learning without giving away the “punchline” of the lesson.    **What participants do**  Participants consider candidate main learning goals and focus questions in light of the analysis guides, then match main learning goals to focus questions.    **Resources**   * BSCS Journal * Posters   + STeLLA Conceptual Framework * Charts   + Norms   + Purpose/Key Features A, B, I/9 * PD Binder   + MLG AG (p. \_\_)   + FQ AG (p. \_\_)   + SCSL I/STL 9 AG (p. \_\_)   + Lesson Analysis: The Basics (p. \_\_)   + Video clips & transcripts (p. \_\_) * Video Clips   + **Classroom Clip: Mawlawi\_SECL2\_Strategy A**- This clip is from the second day of lesson 2 from Sun’s Effect on Climate and Seasons. Early in the lesson, Ms. Mawlawi presents the lesson focus question and a relevant question from the driving question board. This clip picks up with a whole class review of the January/July average temperature bar graphs by latitude.   + **Classroom Clip (B, I/9) SSUP\_Charles\_G5\_SEC\_L2\_C1-3-** This clip, the teacher reminds students of the Unit Central question and calls on students to recall what was learned from the previous lesson. She then introduces them to the lesson focus question. At the end of the lesson, after reminding students of the lesson's focus questions, the students are asked to complete a hand-out with sentence stems to summarize their answers to the focus. Finally, the teacher begins to summarize the science ideas learned from the activities of the day. |  | 1. Lesson Analysis: The Basics (0 min)    1. Share the basics. |
|  | 1. **Prep for Video Analysis: Context (5 min)**    1. Direct participants to the transcript (Mawlawi) in binder p. \_\_.    2. Share the context of the video: This clip is from the second day of lesson 2 from Sun’s Effect on Climate and Seasons. Early in the lesson, Ms. Mawlawi presents the lesson focus question and a relevant question from the driving question board. This clip picks up with a whole class review of the January/July average temperature bar graphs by latitude.    3. Highlight the FQ & MLG. |
|  | 1. **Lesson Analysis: Identify MLG (15 min)**    1. Watch the video clip and be prepared to analyze 1) the match between the main learning goal that the teacher is attending to and the main learning goal of the lesson and 2) the quality of the main learning goal using the MLG AG. |
|  | 1. Analysis Using Analysis Guide (20 min)    1. Use the analysis guide to help determine the quality of the learning goal.    2. Share the MLG for L1: Because Earth is a sphere, the sun’s light hits Earth’s curved surface more directly close to the equator and less directly closer to the poles. The difference in the angle of sunlight striking Earth’s surface at different latitudes causes uneven heating. |
|  | 1. Reflect and Apply (10 min)    1. Provide time for reflection.    2. Key ideas to highlight       1. MLGs matter. Review the SCSL strategies in the Conceptual Framework to note the focus on MLG.       2. 10-15 min spent on a question such as, what’s the difference between climate and weather may be needed…or not. It’s 10-15 min that you won’t have to give to other learning. Keep in mind that kids have experienced many lessons focused on weather. |
|  | 1. **Context (0 min)**    1. Direct participants to the transcript (SSUP\_Charles\_G5\_SEC\_L2\_C1-3) in binder p. \_\_.    2. Share the context of the video. Clip 2 shows the teacher introducing lesson 6 while Clip 3 shows the teacher wrapping up/summarizing the lesson. |
|  | 1. **Video Analysis: Identify (15 min)**    1. Watch the video and note evidence of the selected strategies   **PDL Note:** Clear examples of strategies SCSL B/I-STL 9   * C1 * introduces the lesson 2 focus question and distinguishes it from the previous lesson’s FQ. * T revisits FQ * C2 * I: Teacher corrects student language that the sunlight is more direct. * 9: A student notes the sunlight at the equator is more concentrated. * I: Teacher is giving the students sentence stems to summarize the answer to the FQ. * C3: * I: So today we focused on the angle of the light... * 9: Students come up the board to show how they interpreted the model. |
|  | 1. **Analysis Guide: B, I/9 (5 min)**   **PDL Note:** As with other analysis guides, this strategy includes questions to guide analysis   1. Provide instructions for using the B and I/9, analysis guide. 2. Share the lesson FQ. 3. Ask participants to consider the quality of each—the FQ and the synthesize/summarize strategy.   **Transition:** *Note that we’ll consider what summarizing and synthesizing looks like in the classroom and analyze how the use of these strategies influence student thinking.* |
|  | 1. **Video Analysis: Reflect and Apply (10 min)** 2. Offer a few minutes for teachers to record some of their ideas and then invite them to share something they wrote. |
| 1:50 – 2:00 | **Break** | | |
| 2:00 – 4:05  125 min  Slides 27-36 | **Content Deepening**  **Purpose:** The purpose of this session is to model effective STeLLA-based science teaching and learning through a common experience that is grounded in a 3D, phenomena/program driven unit and designed for adult learners.  **Content:** STeLLA model lessons/units attend to the characteristics of effective science teaching and learning (e.g., 3D, phen/prob-driven, student-centered, make student thinking visible and support sense-making, coherent, and access/engage PK and develop metacognitive abilities).  The content deepening experience will include explicit modeling and use of STeLLA strategies.  As Earth orbits the Sun in a nearly circular orbit, its axis always tilts in the same direction. Earth’s consistent tilt causes the Northern Hemisphere to lean toward the Sun at certain times of year, specifically during June, July, and August, and away from the Sun at other times of the year—during the months of December, January, and February. Earth’s Northern Hemisphere experiences summer when it leans toward the Sun while the Southern Hemisphere experiences winter. Conversely, Earth’s Southern Hemisphere experiences summer in when it leans toward the Sun while the Northern Hemisphere experiences winter. (Note that the seasonal variations that we call summer and winter do not occur at latitudes close to the equator.) When Earth’s hemispheres lean neither toward nor away from the Sun along Earth’s orbit, we experience spring and fall.  **What participants do**  Participants will use given materials to show/explain why are some places on Earth hotter than others at different times of the year. By representing the Earth-Sun system, participants will discuss how models can be used to refute or support claims.  **Resources**   * BSCS Journal * Posters   + STeLLA Conceptual Framework Poster * Charts   + Norms chart * Lesson Materials   + Blow-up Globe   + Chart Paper/group   + North Star cut out and posted   + A few sticky notes/person   + Styrofoam Ball/Stick/Hula Hoop * Handouts in SSUP binder   + HO: Earth’s Orbit Around the Sun (p. \_\_\_) |  | 1. **Content Deepening: Teacher Set-up (30 min)**    1. Build from the session prior to lunch and connect to content deepening experiences.    2. Provide instructions for the task by revealing the first two questions and providing time for discussions in groups of 3-4.       1. The focus questions and synthesize/summarize tasks are in their science notebooks.       2. Participants will use their notes to draft potential main learning goals. Remind them to use their summary documents, Z-folds, charts, and analysis guide to help them.       3. Whip around and have each group share their ideas either 1 strategy at a time or across all 3 strategies.    3. Introduce the FQ for lesson 4 and transition from teacher set up to the science learner experience. L4FQ: What causes winter in the US to occur in Dec/Jan and summer to occur in the US in Jun/Jul? What is happening in Brazil and why? Point to the FQ on the chart.   **PDL Note:** The entire content deepening experience should include attentions to strategies A, B, I/9.  **Transition:** *Let’s explore elements of the Earth-Sun System using a physical model and see if we can answer the question, Why is it summer in the United States (North America) when it is winter in Argentina (South America)?* |
|  | 1. **Explore the Earth-Sun System (10 min)**    1. Invite each participant to draw a picture of the Earth-Sun system with as much detail as they can in about 4-5 min. They should label their diagram and draw it as if they were looking down on the Earth and Sun. Note that they’ll add to/revise their diagram later and will be asked to share how their thinking has changed (or not).    2. Begin by tossing a blow-up globe to a participant who may have less subject matter background and asking the questions below. You may invite them to toss the globe to someone else.       1. What questions would you ask yourself and what would you be doing with the globe to answer the question: Why is it summer in the United States (North America) when it is winter in Argentina (South America)?       2. Would everyone know to do/think what you did?    3. Participants are likely to point to the northern and southern hemispheres, the equator, possibly the tropics, and the poles. They may refer to the tilt and the North Star.    4. Invite a participant to represent the Earth-Sun system by asking the following questions.       1. What are the parts of the system?       2. How could we represent those parts?       3. How is what we are using similar to or different from the real world?    5. As they walk around the sun, participants are likely to spin the globe, walk in an ellipse, and tilt and/or wobble the globe (or not). Ask the following questions       1. Why are you doing that?       2. Would you expect everyone to do it that way?    6. Provide instructions for setting up    7. Use questions such those below to uncover, negotiate and/or highlight key science ideas. Distribute hula hoops as needed.       1. What if I claimed that Earth is closer to Sun in the summer? Winter? What evidence would you offer to support/refute my claim? How could you use your model?       2. What if I claimed the orbit of Earth around the Sun is an ellipse? What evidence would you offer to support/refute my claim? How could you use your model?       3. What if I claimed the Earth is always tilted toward the Sun/away from the Sun? What evidence would you offer to support/refute my claim? How could you use your model?    8. Ideas to uncover, negotiate and/or highlight include:       1. Scale and proportion including distance from Sun to Earth at different times of year and the distance from Sun to equator and poles.       2. The optical illusion of a strongly elliptical orbit.       3. The nearly circular orbit of Earth.    9. **PDL Note:** Get as far as possible with L3 and continue with L4 (slides 22-23) as possible. Use questions such as those below to uncover, negotiate and/or highlight key science ideas.       1. What if I claimed that Earth is closer to Sun in the summer? Winter? What evidence would you offer to support/refute my claim? How could you use your model?       2. What if I claimed the orbit of Earth around the Sun is an ellipse? What evidence would you offer to support/refute my claim? How could you use your model?       3. What if I claimed the Earth is always tilted toward the Sun/away from the Sun? What evidence would you offer to support/refute my claim? How could you use your model?    10. Ideas to uncover, negotiate and/or highlight include:        1. Scale and proportion including distance from Sun to Earth at different times of year and the distance from Sun to equator and poles.        2. Optical illusion of a strongly elliptical orbit.    11. Listen for participants to talk about relative amounts of daylight experienced at different locations on Earth (e.g., 24 hours of sunlight at the North Pole in Jun/July/summer). This idea is important in L5. |
|  | 1. **Explanation (20 min)**    1. Use this slide to have different groups try out their responses based on their responses to the claims/evidence provided in the previous slide. |
|  | 1. **Explanation (30 min)**    1. Provide instructions for the task.    2. Once all groups have charted their explanations invite them to get a stack of sticky notes to pose questions and provide substantive feedback on one another’s explanations. Pay attention to time and extend or trim this part of the session.    3. Provide examples and non-examples of constructive feedback/questions.       1. Examples          * 1. Your drawing is helpful because...            2. What do you mean by…?            3. What are the units for this measure?       2. Non-examples          * 1. The drawing is helpful.            2. Nice!    4. Invite groups to return to their charts and review feedback. Highlight that not all feedback is helpful and they should consider it carefully. Note that with more time, they’d revise their explanations, but for our purposes, they should identify one change they’d make based on what they learned from other groups and/or from the feedback/questions on their charts.    5. Whip around and gather one idea from a couple of groups. |
|  | 1. **Meta Moment (10 min)**    1. Remind participants of the various representations.    2. Invite them to create this table in their science notebooks and assign one example to different small groups and have them complete the second column.    3. Expect responses such as:  |  |  | | --- | --- | | Flashlight/Tray | Helped me realize how important it is to consider how different people think about and what they already know about the content.  Helped me consider the S&L of different models/analogy map. | | Ball/Stick | Helped me realize how important it is to consider how different people think about and what they already know about the content.  Helped me consider the S&L of different models. | | Ball/Stick/Hula Hoop | We had to use the model to provide evidence of our claim and test our explanations. I really had to think to link my ideas to the evidence in the model.  It was easier to see what other people thought, too. | | Explanation | We had to offer a claim, evidence, and representation to make our thinking visible. Some explanations were better than others…some representations were more helpful. |  * 1. Whip around and gather ideas. Make sure everyone fills in the full table.   **PDL Note:** Remind them of the importance of metacognition and while this isn’t necessarily in the classroom curriculum, it’s certainly something that I’d use in the classroom. |
|  | 1. **Reflection (5 min)**    1. At this point, the learning experiences have attended to the primary factors, except for day length which is the focus on L5. |
|  | 1. **DQB (5 min)**    1. Invite participants to identify questions they’ve answered and add new ideas to the board.    2. Highlight questions related to the FQ for L5. |
|  | 1. **CD: Teacher Follow up (15 min)**  Provide instructions for the task.Invite participants to share their ideas and populate the wall charts.If they haven’t already figured out the headers, then add them. For example: *You may have noticed that I’ve been sorting your ideas onto the 4 pieces of chart paper. If you were going to place headers at the top of each chart, what would they be? Talk to someone near you?*After a few minutes, ask if anyone would be willing to put an idea on the table and see what others think. Record their ideas at the top of each chart more or less as stated. Share the categories by which you were sorting. |
|  | 1. **STeLLA Strategies Booklet (0 min)**   **PDL Note:** Notice that this slide and the next few are considered part of the Teacher Follow-up.   1. Revisit focus of session. |
|  | 1. **Identifying Strategies (10 min)** 2. Emphasize the importance of making links between what we do and what we learn. 3. Provide instructions for this task. |
| 4:05 – 4:30  25 min  Slides 37-42 | **Closing**  **Purpose:** The purpose of the closing is to continue to build community, reflect on the day, and set the stage for tomorrow’s learning.  **Content:**Focus Questions   * Why is one main learning goal (SCSL Strategy A) essential for coherence of the Science Content Storyline? * How does the use of a focus question (SCSL Strategy B) contribute to the coherence of the Science Content Storyline? * How does synthesizing and summarizing key science ideas (SCSL I/STL 9) contribute to the coherence of the science content storyline? * How can we begin and end a lesson using STeLLA Strategies? * Why is it warmer in the summer than in the winter?   **What participants do**  Participants reflect on learning from day 3.  **Resources**   * BSCS Journal * PD Binder   + Daily Reflection (if applicable) * STeLLA Strategies Booklet * SCSL Z-fold |  | 1. Meta Moment (5 min)    1. Provide instructions for the task. |
|  | 1. Revisit Effective Science T&L (10 min)    1. Invite participants to revise their effective science T&L charts based on their experiences/learning so far. Remind them to use a different color marker. |
|  | 1. **Day 3 Focus Questions (0 min)**    1. Highlight the FQs. |
|  | 1. **Reflection (5 min)** 2. Direct participants to the daily reflections sheet (PD Binder p.\_\_). Completed sheets can be left in the center of each table. 3. Remind Participants about the parking lot should they need to post a question or need. |
|  | 1. **Homework (5 min)** 2. Provide instructions for completing the homework assignment. |
|  | 1. **BSCS (0 min)** |