

CCSS Follow up Training for Grades 2-5: Thinking Through the Lesson Protocol and Concept Lessons

Los Angeles Unified School District
Elementary Mathematics

OH # 1

Welcome to our Common Core State Standards Follow-up Professional Development on Thinking Through the Lesson Protocol and Concept Lessons. Today we'll be exploring how to engage our students in deeper conversations about math.

Objectives

- Explore how the concept lesson supports CCSS
- Understand how the components of a concept lesson link to the Thinking Through a Lesson Protocol (TTLP)
- Engage in a concept lesson
- Identify strategies that meet the needs of diverse learners

OH # 2

As we move into the Common Core State Standards, the concept lesson is a powerful vehicle for students to build conceptual understanding and make authentic use of the Mathematical Practices. Over the last several years, teachers in the upper grades have been using the TTLP lesson planning tool to teach concept lessons. Today we'll show how the components of a concept lesson link to the Thinking Through a Lesson Protocol. We'll engage in a concept lesson by generating possible student solutions, anticipating student misconceptions, writing questions to address misconceptions, and to facilitate a mathematically productive discussion. In addition, we'll identify strategies that meet the needs of diverse learners: English language learners, standard English language learners, gifted and talented students, students with disabilities and other students with special needs.

Objectives

- Connect TTLP to the Teaching and Learning Framework:

Standard 3: Delivery of Instruction

b. Using Questioning and Discussion Techniques

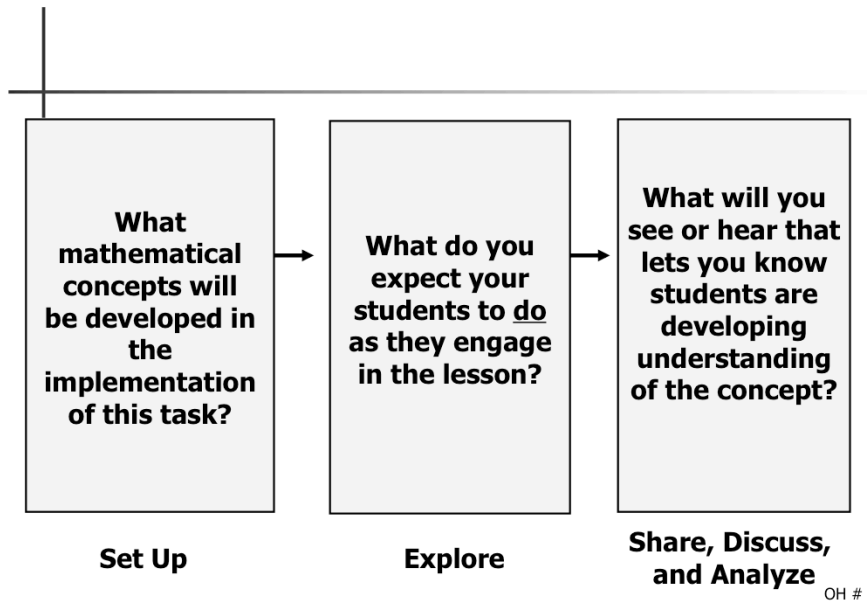
1. Quality and Purpose of Questions
2. Discussion Techniques and Student Participation

- Prepare you to teach a concept lesson

OH # 2A

We'll also connect the TTLP to the Teaching and Learning Framework, Standard 3: Delivery of Instruction, sub-set B: Using Questioning and Discussion Techniques. We'll look at the quality and purpose of questions to guide instruction, and focus on the discussion techniques that lead to student participation. And, we'll be preparing you to teach a concept lesson.

Thinking Through a Lesson Protocol



The Thinking Through the Lesson Protocol has three phases: Set Up, Explore, and Share, Discuss and Analyze. The Set Up phase asks: What mathematical concepts will be developed in the implementation of this task? The Explore phase asks: What do you expect your students to do as they engage in the lesson? And the Share, Discuss and Analyze phase asks: What will you see or hear that lets you know students are developing understanding of the concept?

TTLP

- ☐ Read through the Thinking Through the Lesson Protocol
- ☐ Reflect on connections with the Before/During/After Lesson Planning Tool

OH # 4

Take some time to read through the Thinking Through a Lesson Protocol, which is handout #1 in your packet, and as you read, note pieces of the TTLP that are similar to the Before/During/After lesson planning tool that you have used, which is handout #1A. Reflect on the connections with your table. When you're ready to move on, click the "Next" button to continue.

Thinking Through a Lesson Protocol

Set Up

- What are your mathematical goals for the lesson?
- In what ways does the task build on students' previous knowledge?
- What are all the ways the task can be solved?

Explore

Share,
Discuss,
and
Analyze

OH # 9

The Set-Up Phase is an opportunity to plan the lesson. It asks: What are the mathematical goals for the lesson? In what ways does the task build on students' previous knowledge? What are all the ways the task can be solved?

Rationale for Set Up

“During the planning phase, teachers make decisions that affect instruction dramatically. They decide what to teach, how they are going to teach, how to organize the classroom, what routines to use, and how to adapt instruction for individuals.”

Fennema & Franke, 1992, p. 156

Fennema, E. & Franke, M. (1992). Teachers' knowledge and its impact. In Douglas Grouws (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 147 - 164). Indianapolis, IN: Macmillan Publishing Inc.

OH # 5

“During the planning phase, teachers make decisions that affect instruction dramatically. They decide what to teach, how they are going to teach, how to organize the classroom, what routines to use, and how to adapt instruction for individuals.” As we look at the concept lesson today, we’ll be using our collective knowledge to plan the most effective lesson for our students.

Concept Lesson

- Read the “Set Up” phase of the concept lesson
- What connections do you see between the concept lesson and the TTLP?
- What connections do you see between the concept lesson and the Math Practices?

OH # 10

Embedded in the concept lesson are examples of the questions outlined in the TTLP, and how they are addressed. Our goal is to read the concept lesson and consider what connections you see between the concept lesson, the TTLP and the Math Practices. Read the Set-Up pages of the concept lesson. You'll see “Set Up” written in the left hand column of the concept lesson. When you're finished reading, discuss the connections with your group. Please click the “Next” button when you are ready to continue.

Anticipating Solutions

- During the concept lesson, we share several solution paths.
- Solve the problem at least two ways, and share your strategies with the group.
- Talk with your table about the benefits of anticipating possible solutions before using a task.

OH # 11

During the concept lesson, we share several solution paths. Solve the problem at least two ways, and share your strategies with the group. Take a moment to talk with your table about the benefits of anticipating possible solutions before using a task. When you're ready to continue, click the "Next" button.

Anticipating Misconceptions

- What student misconceptions do you anticipate?
- What are the differences between misconceptions and errors?

OH #12

What student misconceptions do you anticipate? What are the differences between misconceptions and errors? Talk with your table, and click the “next” button to continue.

Additional Considerations

- What lessons have come before and what lessons will come after this task to support the building of conceptual understanding?

OH # 13

When in the unit would be the best time to do the concept lesson. Traditionally, we have introduced concept lessons at the beginning of a unit, in order to allow students the opportunity to build conceptual understanding. The students reveal what they know to the teacher, so that the teacher can plan the next steps, based on where the students are, and where they need to go. The concept lesson is not a test, or an assessment. It is an exploratory lesson. Take a moment to discuss when and where you might introduce this concept lesson. Click the "Next" button when you're ready to move on.

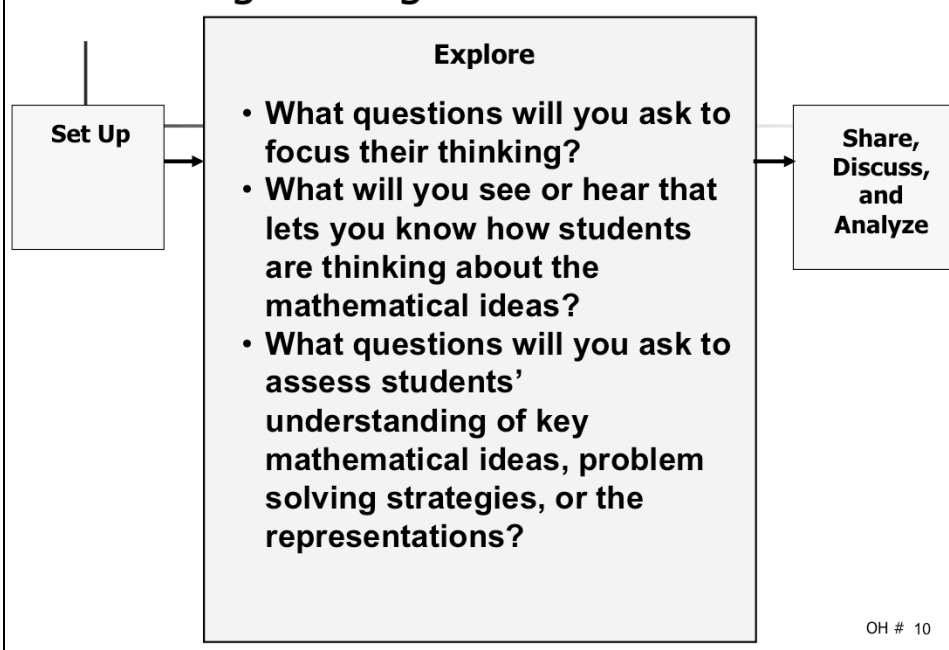
Addressing Diverse Learners

In what ways does the Thinking Through a Lesson Protocol support the needs of diverse learners: ELs, SELs, GATE students, students with disabilities, and other students with special needs?

OH # 14

In what ways does the TTLP support the needs of our diverse learners? Take a few minutes to work with your table. How does asking different levels of questions differentiate for diverse learners? Where do you see opportunities for students to have instructional conversations, work in cooperative groups, develop academic vocabulary and use graphic organizers and visual tools? Please click the “Next” button when you’re ready to continue.

Thinking Through a Lesson Protocol



In the Explore phase, we ask: What questions will you ask to focus their thinking? What will you see or hear that lets you know how students are thinking about the mathematical ideas? What questions will you ask to assess students' understanding of key mathematical ideas, problem-solving strategies, or the representations?

Rationale for Explore Phase

- “Our data shows that when teachers ask more conceptual questions, students start to ask conceptual questions themselves.”

-- J. Boaler & K. Broadie from “The Importance, Nature and Impact of Teacher Questions.” (2004)

OH #

Here’s what the experts say, “Our data shows that when teachers ask more conceptual questions, students start to ask conceptual questions themselves.”

Questioning Strategies

In the TTLP, we use questioning strategies to move students' learning.

Take a moment to read and highlight the questions in the Explore phase of the concept lesson that stand out to you. Think about how these questions support the Math Practices.

OH # 13

In the TTLP, we use questions to move the students' learning, we don't tell them what to do. Please use a highlighter to mark the questions in the Explore phase of the concept lesson that stand out to you. Think about how these questions support the Math Practices. When you're ready to move on, click the "Next" button.

Explore: Categorizing Questions

- ☐ Decide whether your highlighted questions:
 - ☐ Focus
 - ☐ Assess or
 - ☐ Advance
- ☐ Use the sample questions in HO#2 to help categorize the questions

OH # 14

The TTLP categorizes questions into three types: Focusing, Assessing or Advancing. Focusing questions get the students to look at what the problem is asking, it's a way to clarify words that they don't know, or situations of which they are unfamiliar. Assessing questions are a way for us to know what the students' mathematical thinking is. How does that answer make sense in light of the problem? How do you explain your thinking? And Advancing questions take all students farther down the road. They are not just for the advanced student, as any student can have their thinking extended by asking: What pattern do you see in your answers? Or how can you apply your thinking to another situation?

Talk with an elbow partner and discuss the types of questions that you've highlighted. Are they Focusing student learning? Assessing student learning? Or Advancing student learning? Please identify and mark at least one question in each category. You can write the type of question right on your concept lesson. Handout #2 provides sample questions to assist you. Click the "Next" button when you're ready to continue.

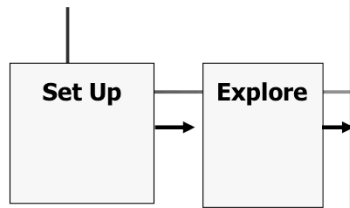
Explore: Creating Questions for Diverse Learners

- ☐ Write at least one more question, that will:
 - ☐ Focus
 - ☐ Assess
 - ☐ Advance
- ☐ Remember to create questions that are
 - ☐ open-ended
 - ☐ aligned to the mathematical concepts
 - ☐ consider the misconceptions that were identified

OH # 15

The Teaching and Learning Framework calls for careful use of questioning. Now is the time to work with your group to create additional questions for diverse learners for this concept lesson. Please write at least one more question for each of the three question types: Focusing, Assessing and Advancing. Remember to write questions that are open-ended, aligned to the mathematical concepts and consider the misconceptions that were identified. Click the “Next” button to continue.

Thinking Through a Lesson Protocol



Share, Discuss, and Analyze

- Which solution paths do you want to have shared during the class discussion? In what order will the solutions be presented? Why?
- In what ways will the order in which solutions are presented help develop students' understanding of the mathematical ideas that are the focus of your lesson?
- What specific questions will you ask so that students will:
 1. make sense of the mathematical ideas that you want them to learn?
 2. expand on, debate, and question the solutions being shared?
 3. make connections between the different strategies that are presented?
 4. look for patterns?
 5. begin to form generalizations?

OH # 12

In the Share, Discuss and Analyze phase, we ask: Which solution paths will be shared? In what order? What questions will be asked so that students make sense of the mathematical ideas?

Rationale for Share, Discuss and Analyze Phase

"A key challenge mathematics teachers face in enacting current reforms is to orchestrate discussions that use students' responses to instructional tasks in ways that advance the mathematical learning of the whole class."

Stein, M. K., Engle, R. A., Hughes, E. K., & Smith, M. S. (2006) Orchestrating productive mathematical discussions: Helping teachers to learn to better incorporate student thinking.

OH # 4

The Share, Discuss and Analyze phase is important to the concept lesson's success. "A key challenge mathematics teachers face in enacting current reforms is to orchestrate discussions that use students' responses to instructional tasks in ways that advance the mathematical learning of the whole class." In the concept lesson, the teacher selects 3 – 4 pieces of student work to share to meet the objectives of the lesson. And the students do the talking.

Concept Lesson

- Take the next few minutes to read the Share, Discuss and Analyze phase of the Concept Lesson
- With your group, discuss what the teacher is doing and what the students are doing in the areas of content and Math Practices

OH # 13

Please take a moment to read the Share, Discuss and Analyze phase of the concept lesson. With your group, discuss what the teacher is doing, and what the students are doing in the areas of content and the Math Practices during this phase. Click on the “Next” button to move on.

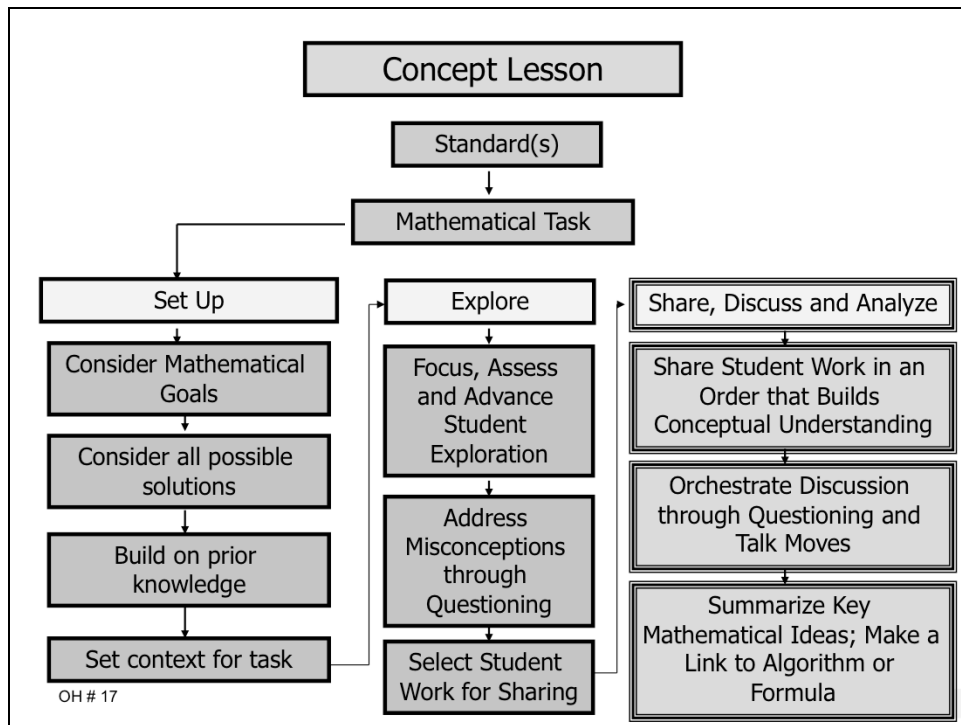
Share, Discuss and Analyze: Analyzing Solutions

- Add questions to the concept lesson:
What questions will you ask to connect solutions and strategies to the lesson's objectives?

OH # 16

Now is the time to work with your group to create questions to guide the sharing of the work. Remember, it's 3-4 strategically chosen pieces of student work that you will tie together through questioning. What questions will you ask to connect solutions and strategies to the lesson's objectives?

Click the "Next" button to continue.



This graphic is handout #3 in your packet. It can be referenced as you teach the concept lesson in your classroom. As we move into the Common Core State Standards, we believe that the concept lesson is a powerful vehicle for students to build conceptual understanding and make authentic use of the Mathematical Practices. Thank you for participating in this module on the Thinking Through the Lesson Protocol and concept lessons.