

# Thinking Through a Lesson Protocol

The main purpose of the *Thinking Through a Lesson Protocol* is to prompt you in thinking deeply about a specific lesson you will be teaching that is based on a cognitively challenging mathematical task.

SET-UP <i>Selecting and setting up a mathematical task</i>	EXPLORE <i>Supporting students' exploration of the task</i>	SHARE, DISCUSS, AND ANALYZE <i>Sharing and discussing the task</i>
<ul style="list-style-type: none"> <li>▪ What are your mathematical goals for the lesson (i.e., what is it that you want students to know and understand about mathematics as a result of this lesson)?</li> <li>▪ In what ways does the task build on students' previous knowledge? What definitions, concepts, or ideas do students need to know in order to begin to work on the task?</li> <li>▪ What are all the ways the task can be solved?               <ul style="list-style-type: none"> <li>- Which of these methods do you think your students will use?</li> <li>- What misconceptions might students have?</li> <li>- What errors might students make?</li> </ul> </li> <li>▪ What are your expectations for students as they work on and complete this task?               <ul style="list-style-type: none"> <li>- What resources or tools will students have to use in their work?</li> <li>- How will the students work – independently, in small groups, or in pairs – to explore this task?</li> <li>- How long will they work individually or in small groups/pairs? Will students be partnered in a specific way? If so, in what way?</li> <li>- How will students record and report their work?</li> </ul> </li> <li>▪ How will you introduce students to the activity so as not to reduce the demands of the task?</li> <li>▪ What will you hear that lets you know students understand the task?</li> </ul>	<ul style="list-style-type: none"> <li>▪ As students are working independently or in small groups:               <ul style="list-style-type: none"> <li>- What questions will you ask to focus their thinking?</li> <li>- What will you see or hear that lets you know how students are thinking about the mathematical ideas?</li> <li>- What questions will you ask to assess students' understanding of key mathematical ideas, problem solving strategies, or the representations?</li> <li>- What questions will you ask to advance students' understanding of the mathematical ideas?</li> <li>- What questions will you ask to encourage students to share their thinking with others or to assess their understanding of their peer's ideas?</li> </ul> </li> <li>▪ How will you ensure that students remain engaged in the task?               <ul style="list-style-type: none"> <li>- What will you do if a student does not know how to begin to solve the task?</li> <li>- What will you do if a student finishes the task almost immediately and becomes bored or disruptive?</li> <li>- What will you do if students focus on non-mathematical aspects of the activity (e.g., spend most of their time making beautiful poster of their work)?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ How will you orchestrate the class discussion so that you accomplish your mathematical goals? Specifically:               <ul style="list-style-type: none"> <li>- Which solution paths do you want to have shared during the class discussion? In what order will the solutions be presented? Why?</li> <li>- 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?</li> <li>- What specific questions will you ask so that students will:                   <ul style="list-style-type: none"> <li>▪ make sense of the mathematical ideas that you want them to learn?</li> <li>▪ expand on, debate, and question the solutions being shared?</li> <li>▪ make connections between the different strategies that are presented?</li> <li>▪ look for patterns?</li> <li>▪ begin to form generalizations?</li> </ul> </li> </ul> </li> <li>▪ What will you see or hear that lets you know that students in the class understand the mathematical ideas that you intended for them to learn?</li> <li>▪ What will you do tomorrow that will build on this lesson?</li> </ul>