Grade 5 Lesson-Planning Tool for Mathematical Practice 8

Unit: Operations and Algebraic Thinking (5.OA.3 and 5.G.3)

Date: May 15

Lesson: Problems With Patterns

Learning objective: As a result of class today, students will create tables and graphs representing a real-world problem and draw conclusions based on the data.

Essential Standard for Mathematical Practice: As a result of class today, students will be able to demonstrate greater proficiency in which Standard for Mathematical Practice?

Mathematical Practice 8: "Look for and express regularity in repeated reasoning."

- Students will look for patterns and apply them to answer questions in the context of baking cookies.
- Students will draw conclusions based on patterns.
- Students will explain their thinking and reflect on whether their answer makes sense.

Formative assessment process: How will students be expected to demonstrate mastery of the learning objective during in-class checks for understanding teacher feedback, and student action on that feedback?

- Students will work with partners sharing their conjectures and drawing conclusions.
- Students will supply feedback to each other and reflect on whether their answers make sense.
- Teachers will monitor students' progress and provide feedback by asking assessing and advancing questions.

Probing Questions for Differentiation on Mathematical Tasks

Assessing Questions

(Create questions to scaffold instruction for students who are stuck during the lesson or the lesson tasks.)

- What do we know, and what do we want to find out?
- Could you make a table of values to help guide your thinking?
- How might two tables help you compare the two baking times?
- What conclusion can you make by looking at the graph?

Advancing Questions

(Create questions to further learning for students who are ready to advance beyond the learning standard.)

- What are you wondering about?
- What other times will the two batches of cookies be ready together?
- If you connected the points on the graph for one type of cookie, what do you think you might see?
- Is this occurring for both types of cookies? Why do you think this is happening?
- Write a question that involves patterns. Be sure to remind students to include a table and a graph.

Tasks (Tasks can vary from lesson to lesson.)	**What Will the Teacher Be Doing?** (How will the teacher present and then monitor student response to the task?)	**What Will Students Be Doing?** (How will students be actively engaged in each part of the lesson?)
Beginning-of-Class Routine How does the warm-up activity connect to students' prior knowledge, or how is it based on analysis of homework?	Introduce the lesson's focus on patterns. Show students the first quadrant of a coordinate plane. Ask them to locate (3,5). Ask, "Is (3,5) the same as (5,3)? Explain your thinking." Review the meaning of attributes of basic geometric shapes by asking, "What attributes do squares and rectangles have in common?" Make a list of the attributes that students suggest. Look for students to suggest four right angles, opposite sides are parallel, at least two sides are congruent, and adjacent sides form right angles. Tell students that they will use these attributes as they answer questions during task 1, What's the Point?	Students think about the location of (3,5). After they identify the location, they then consider whether (3,5) is the same as (5,3). Students share their response with a partner. Students think independently and then share their ideas with the class.
Task 1 How will students be engaged in understanding the learning objective? (See figure 8.24.)	Monitor the room to listen to students' conversations as they discuss their responses to the questions in task 1. Consider writing down what you hear them say. Listen for mathematical ideas including vocabulary justifying the rectangle and squares drawn on the coordinate planes (for example, opposite sides are equal or congruent) as well as evidence of collaborative skills. Consider sharing these statements with the class as a part of the closure.	Students again think independently for a few minutes, and then they will join their partners to compare their answers to questions in task 1.

Tasks (Tasks can vary from lesson to lesson.)	**What Will the Teacher Be Doing?** (How will the teacher present and then monitor student response to the task?)	**What Will Students Be Doing?** (How will students be actively engaged in each part of the lesson?)
Task 2 How will the task develop student sense making and reasoning? (See figure 8.25.)	Provide students with a copy of The Big Cookie Bake activity sheet (figure 8.25, pages 230–231). Have students read the problem, and then ask any clarifying questions. Be prepared to help some students make sense of the tables so they can complete them accurately. Start with 0 batches, and ask students, "How many minutes does it take to bake 0 batches?" (Answer: 0 minutes)	Students read the task and have time to ask any clarifying questions. They first work independently. On signal, they confer with their partners and share their understanding.
Closure How will student questions and reflections be elicited in the summary of the lesson? How will students' understanding of the learning objective be determined?	Call on student partners to share with the class what they noticed and what they are still wondering about. What information did they get from the table? What information did they get from the graph? Ask students to reflect on why mathematicians consider patterns to be powerful. What do they think? Consider sharing the statements that you heard students making during task 1 and task 2. Feature any mathematical relationships as well as evidence of students collaborating effectively.	Partners share their findings with the class. Exit ticket questions: As a result of the lesson today, I know that _____. A question I have is _____.

Source: Template adapted from Kanold, 2012c. Used with permission.

References

Kanold, T. D. (Ed.). (2012c). *Common Core mathematics in a PLC at Work, leader's guide*. Bloomington, IN: Solution Tree Press.