Sample Mathematical Practices Lesson-Planning Tool for Third-Grade Plane Geometry

Unit: Plane Geometry **Date:** November 17, 2015 **Lesson:** Compare and Contrast Quadrilaterals

Essential Learning Standard

3.G.1: "Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories" (NGA & CCSSO, 2010, p. 26).

As a result of class today, students will be able to compare and contrast the following quadrilaterals: rectangle, rhombus, square, and trapezoid. (Note: For this lesson, *rectangle* only addresses nonsquare rectangles. Squares as rectangles will be the focus of a subsequent lesson; however, if students approach this concept, then the lesson will accommodate this natural extension of the concept of rectangle.)

Formative Assessment

Students will be expected to demonstrate mastery of the learning standard during in-class checks for understanding by:

1. Identifying (by name) select quadrilaterals
2. Describing (orally, in writing, or by drawings) select quadrilaterals
3. Describing (orally, in writing, or by drawings) similarities between select quadrilaterals
4. Describing (orally, in writing, or by drawings) differences between select quadrilaterals

Probing Questions for Differentiation on Mathematical Tasks

Assessing Questions

1. What is a quadrilateral?
2. What are some characteristics of rectangles?
3. What are some characteristics of rhombuses?
4. What are some characteristics of squares?
5. What are some characteristics of trapezoids?
6. How are [insert shape] and [insert different shape] similar?
7. How are [insert shape] and [insert different shape] different?

Advancing Questions

1. Which of the select quadrilaterals are parallelograms?
2. Which of the select quadrilaterals can be described as regular? Irregular?
3. What is the definition of *rectangle*?
4. What is the definition of *square*?
5. What is the relationship between squares and rectangles?
6. What is the relationship between squares and rhombuses?

Targeted Standard for Mathematical Practice

Mathematical Practice 3: "Construct viable arguments and critique the reasoning of others" (NGA & CCSSO, 2010, p. 6).

Tasks	What Will the Teacher Be Doing?	What Will the Students Be Doing?
	The teacher will be observing, asking questions, responding to student questions, providing appropriate resources for students, and providing targeted support to students.	The students will be actively engaged in the lesson by collaborating in small groups, responding to teacher and peer questions and comments, asking questions, using the learning tools, and recording their work as instructed.

Beginning-of-Class Routines Prior to this lesson, students have explored various two-dimensional shapes on an individual basis. The expectation is that students are already familiar with the shapes and concrete representations of the shapes.	The teacher will distribute a set of plane shape manipulatives (consisting of about ten different shapes); some shapes should be one of each of the select quadrilaterals; the other shapes should not be quadrilaterals. The teacher will ask students to group the shapes in whatever way the students decide. After perhaps one or two iterations of this (or until students group the shapes with four sides and not four sides), the teacher will draw the students' attention to just the shapes with four sides and define them as quadrilaterals.	Students will work in their small groups to sort the shapes, discussing among themselves how to characterize the two groups and why a shape might belong to one group or another.
Task 1 Students will be engaged in making sense of the learning standard by providing information about their prior knowledge. If needed, the teacher will activate this prior knowledge as students discuss similarities and differences between the plane figures.	The teacher will distribute one of each select quadrilateral cut from construction paper, a large piece of paper, and tape to each small group. The teacher will instruct the students to fold the large piece of paper into fourths and to tape one quadrilateral in each section of the paper. The teacher will instruct students to write what they know about the shape in each section. The teacher will introduce that the learning objective is for students to use what they know about each shape to compare and contrast the shapes.	Students will arrange each shape as the teacher instructed and proceed to discuss (within the small group) what they know about the shape, including the name of each shape. Students might discuss characteristics of the shape as well as where they see representations of the shape in their environment.
Task 2 This task will develop student sense making and reasoning by requiring students to consider the responses of other students and to use this information to check their own understanding.	The teacher will ask each small group to share its results on one or more shapes with the whole class. The teacher will develop a master sheet and record the groups' information. The whole-class information will fuel comparing and contrasting of the quadrilaterals.	As students listen to what other students know about the shape, they will check where there are similarities to what they've written, add additional notes to what they've written, voice disagreement with what other students share, and provide justifications for their disagreements.
Task 3 This task will require student conjecture and communication by promoting mathematical discourse that provides opportunities for debate and consensus.	The teacher will call out two shapes and ask students to compare and contrast (naming similarities and differences)—picking combinations among rectangle, square, rhombus, and trapezoid.	Students will respond (orally, in writing, or by drawing) with the similarities and differences between a pair of quadrilaterals. Students will ask questions of their peers regarding suggestions about similarities and differences between the shapes.

Closure The teacher will use assessing and advancing questions in a summary of the lesson to elicit student questions and reflections. The teacher's assessment of students' interactions during instruction and students' mathematics journal entries will determine understanding of the learning standard.	The teacher will distribute the four shapes to each student. The teacher will ask what characteristic all of the shapes have in common. The teacher will review each student's mathematics journal as students proceed with the task.	The students will tape the shapes into their mathematics journals. Beside each shape, the student will write characteristics of the shape. At the bottom of the journal page, students will write four statements to compare and contrast any two select shapes.