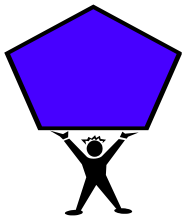
CONSTRUCTING TASK: SHAPE SORTER



Adapted from Activity 8.1 in Teaching Student Centered Mathematics 3-5, by John Van de Walle and LouAnn Lovin

STANDARDS FOR MATHEMATICAL CONTENT

MCC3.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.

STANDARDS FOR MATHEMATICAL PRACTICES

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND

Students should have had experience with identifying two-dimensional shapes (no matter the position, orientation, or size) and begun to use the properties of the shapes to further develop understanding of shapes. These properties can include number of sides, number of corners (vertices), and may have included the length of the sides. Two-dimensional shapes include triangles, quadrilaterals (square, rectangle, and trapezoids), circles, pentagons, and hexagons.

ESSENTIAL QUESTIONS

- Is it possible for a square to be a rectangle? Is a rectangle a square?
- Do you think shapes might be grouped together in the same family or classification? Explain.
- How do you know the difference between shapes if several of them have the same number of sides?
- How is a rhombus different from a square, rectangle, or trapezoid?

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MATERIALS

- An assortment of shapes for sorting
  http://www.ablongman.com/vandewalleseries/Vol_2_BLM_PDFs/BLM20-26.pdf
  Or see the attached sheets
- Math Journals
- Chart Paper

GROUPING

Groups (4 students per group works well)/Individual

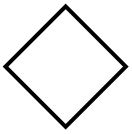
TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

1. Divide students into groups of four. Each group of students should have an assortment of shapes. These shapes should be regular and irregular shapes. Once students are in groups, each student will pick a shape and tell 2 or 3 things they find interesting about the shape (No right or wrong answer.) You might want the students to write in their journal before sharing.
2. After all students share about their first shape, students will pick a second shape from the group's assortment. Each student will then try to find something that is the same about the two shapes and something that is different about the shapes chosen. Students may journal this before sharing with their group (see example of Compare/Contrast Matrix below). After comparing/contrasting the two shapes, students will share with their group. Students within the same group should begin to create a list of words that are common among the shapes. All words that describe the shapes should be accepted (pointed, curvy, lines look like train track, etc.) and then you can introduce the correct math vocabulary.

Example of Compare/Contrast Matrix

My Shapes are the	Attribute	Shape # 1	Shape #2
Same			
Different			

Student Example of Compare/Contrast Matrix

My Shapes are the:	Attribute	Shape # 1	Shape #2
			
Same	**Has a corner like an L**	**Yes**	**No**
Different	**All sides are the same length**	**Yes**	**No**

3. Allow all groups to share with the class the similarities and differences between the shapes. Make a class anchor chart of words that describe shapes. This anchor chart might include the words: sides, angles, corner/vertices, and the names of shapes.

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4. The group will continue exploring the shapes by selecting one shape at random and placing it in the center of the group. The task for the group is to find all of the other shapes that are like the target shape (which is the shape that is in the center of the group) according to the same rule. Students might say, "This shape is like the target shape because it has ____ and _____."
   Example: This shape is like the target shape because it has curves and one straight side. Challenge students to use the same target shape but sort the shapes using a different property. For students that struggle with this challenge, have them refer back to the anchor chart to pick another property.

FORMATIVE ASSESSMENT QUESTIONS

- Describe your shape to me.
- Why does this shape belong with these shapes and not in this other group?
- How might this shape fit with these?
- Did you learn any new words today? What does the word _____ mean? Draw a picture to show the word?
- Do you agree with your group members' decisions about the categories chosen for each shape? Did you see the shape in a different way?

DIFFERENTIATION

Extension

- Students that need the extension might want to compare 3 shapes using the Compare/Contrast Matrix. They may be ready for more sophisticated vocabulary to describe the sides and corners (parallel, perpendicular, right angle, obtuse angle, acute angle, line symmetry, etc.)

Intervention

- Students that struggle with this activity are still Level 0 thinkers in the Van Hiele Levels of Geometric Thoughts. Students in this level need experiences where they can observe, feel, build (compose), take apart (decompose), or work with both two and three dimensional shapes in some manner. To help students advance, the focus should be on specific characteristics or properties to help student develop an understanding of geometric properties. Effective questioning techniques will help students clarify their thinking. Examples of questions: Can you draw a triangle that looks different than this one?  Is this rectangle  like this one  ? How are they different? Explain why this shape  is like this one  ? The shapes used for the sort can be used with the struggling learner for many different activities.

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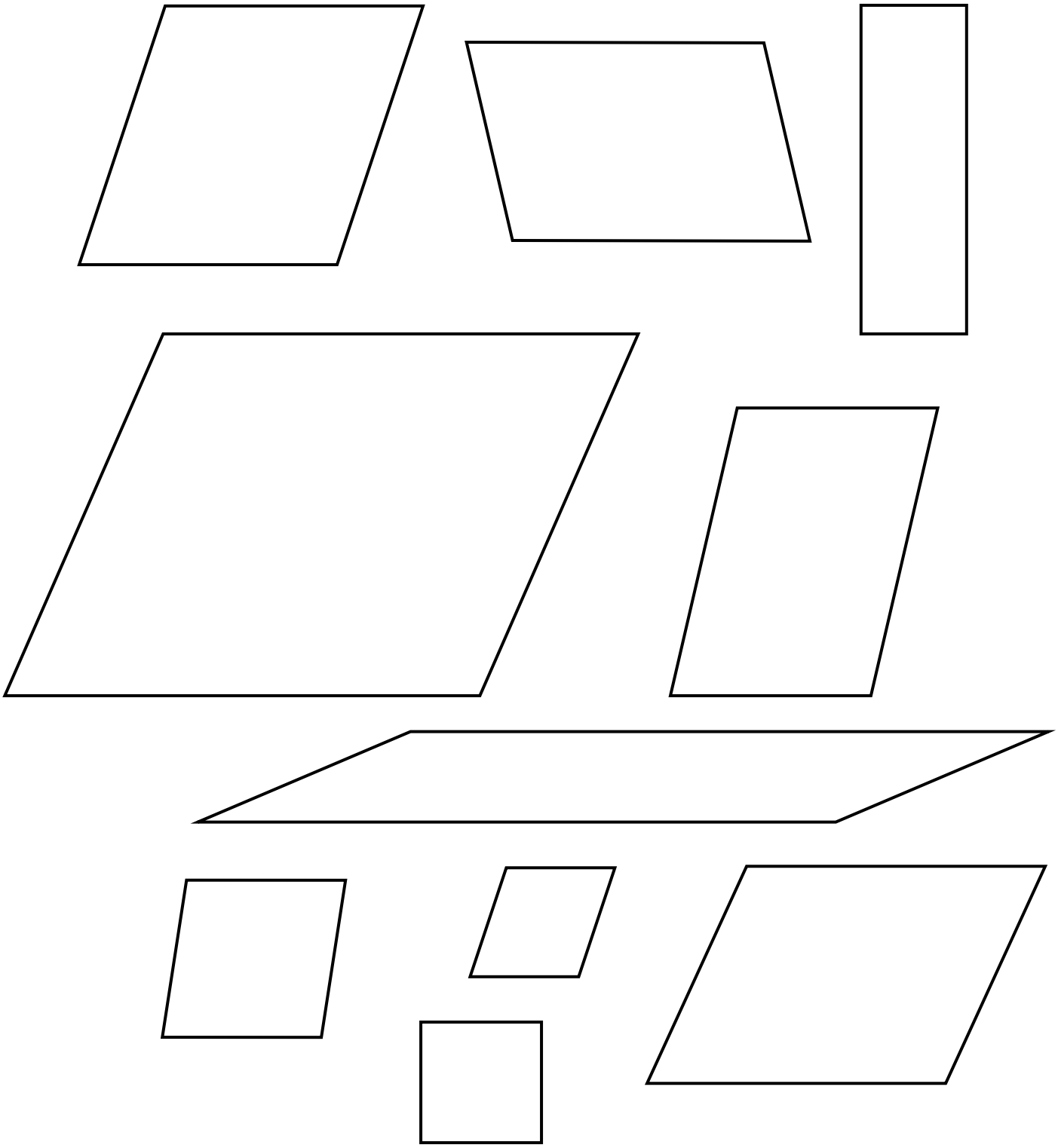

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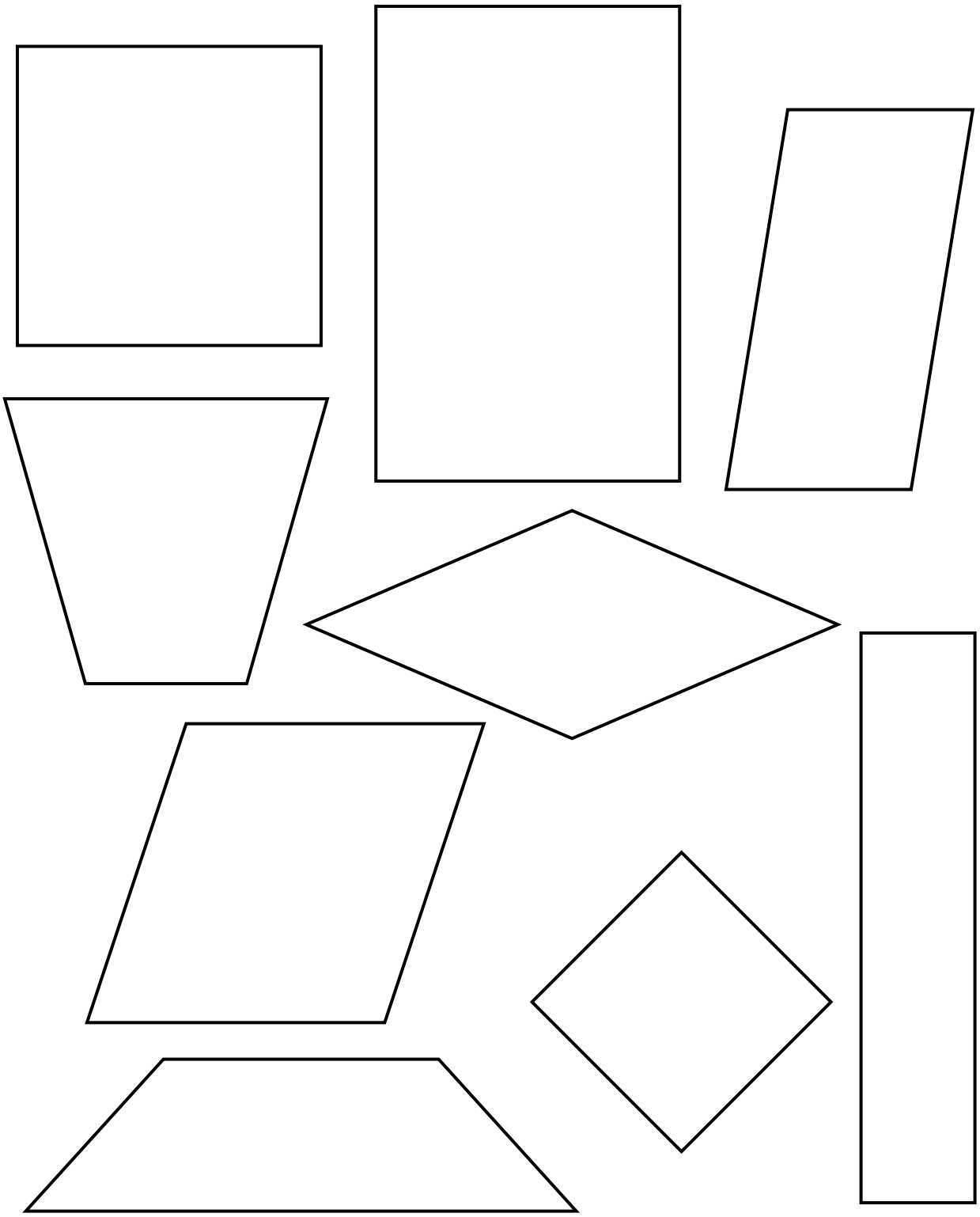

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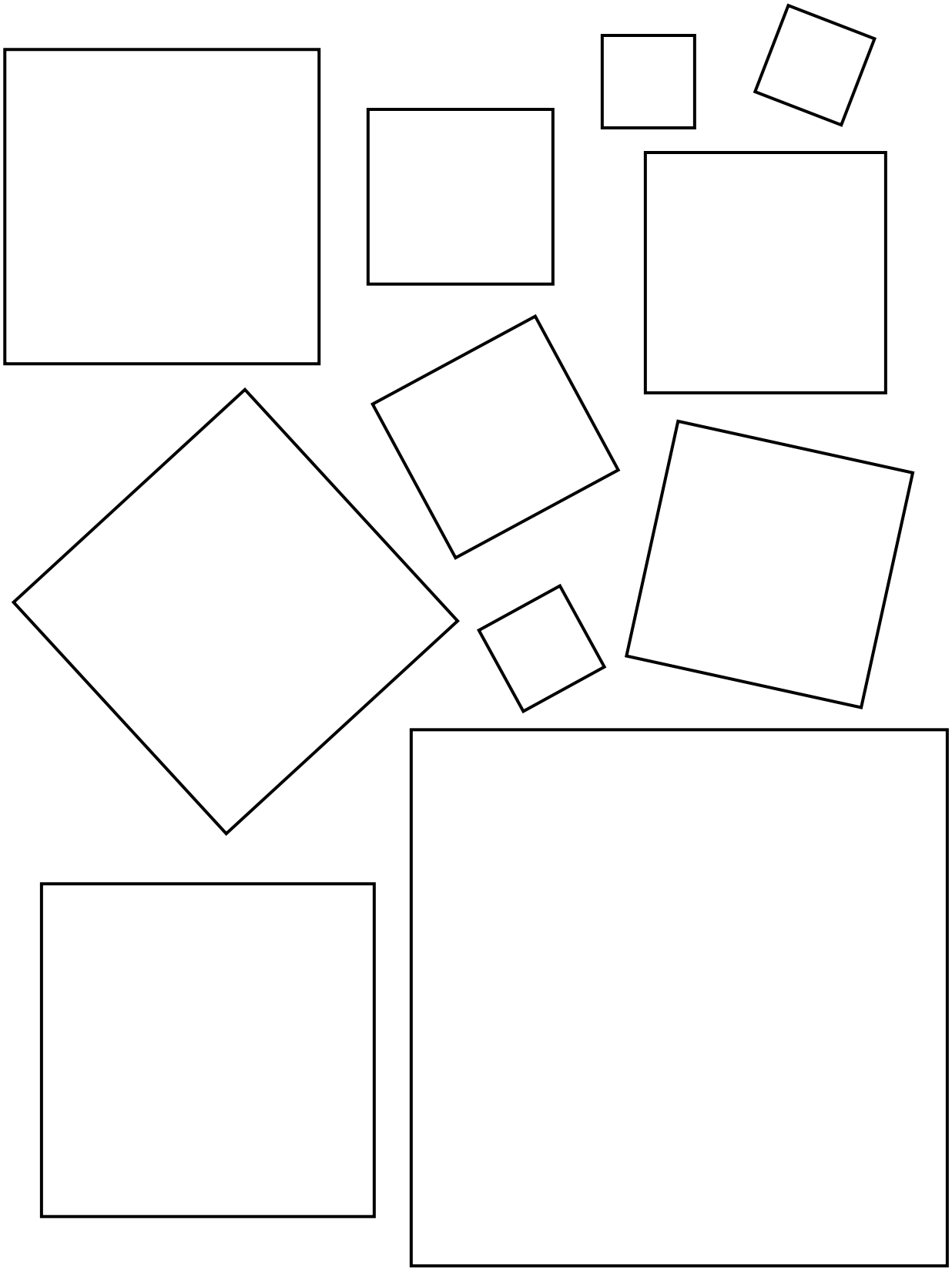

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