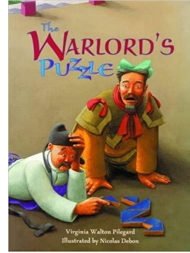


## Valuable Shapes



## Task

If the value of the whole tangram square is one, what is the value of each tangram piece?

## Standards and Learning Targets

**Standard 4.NF.3** Understand a fraction  $a/b$  with  $a > 1$  as a sum of fractions  $1/b$ . In other words, any fraction is a sum of unit fractions. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, for example, by using a visual fraction model. For example,  $3/8 = 1/8 + 1/8 + 1/8$ ;  $3/8 = 1/8 + 2/8$ ;  $2\ 1/8 = 1 + 1 + 1/8$ ;  $2\ 1/8 = 8/8 + 8/8 + 1/8$ .

**Learning Target:** Decomposing fractions

## Lesson Outline

**Anticipate Strategies:** Before you begin this lesson, be sure to anticipate the strategies your students might use to find the value of each shape using the [Picture Book Problem Monitoring Chart](#). For example, students might work backward, beginning with the value of the large triangles, stack the shapes, or guess and check.

**Launch:** Read aloud *The Warlord's Puzzle* by Virginia Pilegard. If time allows, have students work in small groups to put the glass piece back together. After reading, talk about the parts of the tangram and determine the value of one large triangle. Then ask students to work in small groups to determine the value of each of the shapes in the tangram.

[Valuable Shapes Recording Sheet](#)

**Explore:** Students work in groups of 2 or 3 to find the value of each tangram shape. As students work, ask questions about how they know the value of each shape. Give students tangrams or a printout of a tangram that they can manipulate as they work.

**Summarize:** Go through each shape and discuss its value. Ask students how they found the value of each shape. Be sure to allow for a variety of different strategies.

**Extension Ideas:** Find the value of pattern blocks if a hexagon equals one whole.

\*\*\*The idea for this task comes from Boaler, J., Munson, J. & Williams, C. (2017). Mindset Mathematics: Visualizing and Investigating Big Ideas, Grade 4. Jossey-Bass, San Francisco CA.

Thank you for using one of our Picture Book Tasks! We would love to know more about your students' strategies when solving the problem, ideas you had for improving the task, and other math problems you and your students noticed or wondered about after reading the book.

Please complete our [Picture Book Task Survey](#) so that we can learn more about your experience teaching, how students solve problems, and improve our Picture Book Task Bank.