Tangrams and Fractions
Task #7

(This Task builds from Task 1, 3, 4, 5 and 6)

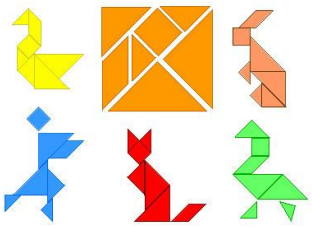
Adapted from North Carolina Department of Public Instruction

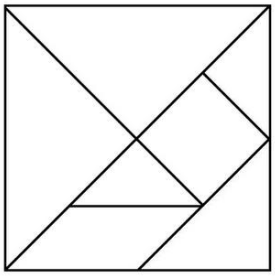
Student Objectives: "I can compare fractions in tangram pieces."

Standards to Measure	**Mathematical Practices**
4.NF.A.1 Explain why a fraction *a/b* is equivalent to a fraction *(n x a)/(n x b)* by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principal to recognize and generate equivalent fractions. **4.NF.A.2** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as ½. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model	1. Make sense of problems and persevere in solving them. 6. Attend to precision. 7. Look for and make use of structure.

Materials:

Tangrams Template- http://mathforum.org/trscavo/tangrams/construct.html Tangrams, Task Sheets (attached)

G **Engage Students with the Goal**	<u>State and Rate</u> Objective: "I can compare fractions in tangram pieces." Students rate themselves to the goal (1, 2, 3, 4).	Setting Objectives and Providing Feedback
A **Access Prior Knowledge**	Show students the pictures of tangrams and ask them: Have you ever heard of a tangram or worked with one before?" Visit Wikipedia with the class to learn more about the ancient "Chinese Puzzles" and their interesting history:   http://en.wikipedia.org/wiki/Tangram	Nonlinguistic Representation

N **New Information**	Introduce the tangram pieces if they are a new manipulative. Explain to students that the 7 pieces of the tangram can be used to make different shapes and designs, but that in this lesson you are trying to find out the fractional parts of the whole tangram and compare their sizes. Today we are going to be using a square as our main shape. Have students work together to create the large square using all 7 pieces of the tangrams.  This square is going to represent our whole in today's activity. The job of the student is to determine what fractional size of each tangram piece, if the large square is one.	Similarities and Differences Nonlinguistic Representation Cues, Questions, and Advance Organizers
A **Application**	Let students work to figure out the fractional size of each tangram piece. It is assumed that the entire square (picture above) represents 1 or 1 whole. Some students may need to place piece on top of each other to compare them to each other. On the tangram task sheet, students record the sizes of each piece. Afterwards, students are to write a description about how they determined the size of the pieces. If students finish early, they can begin to solve Tangram Task Sheet 2. After most students have finished Tangram Task Sheet 1, regroup the entire class together. Have students share the answers and the ways they found them. Ask students for the different ways they started and the paths they took to solve the problems. Discuss any difficulties that students had or that you saw during the explore stage. What strategies help the students find the sized of some of the pieces? Students return to work on finishing Tangram Task Sheets 1- 2. Students can repeat this activity with the large square not being the value of one. Choose one of the pieces in the tangram, and say that it is now 1, what size are the other pieces? What are the other sizes if the small triangle is 1/2?	Cooperative Learning Providing Feedback Generating and Testing Hypotheses Practice and Homework

G **Revisit the Goal**	State and Rate Objective: "I can compare fractions in tangram pieces." Students rate themselves to the goal (1, 2, 3, 4).	Setting Objectives and Providing Feedback

Evaluation of Students
Formative:
How are students using the size of other pieces to discover the size of the one they are working on? Are students seeing the relationship of the sizes in the pieces? Can the student explain their thinking and the steps they took to solve the puzzles?

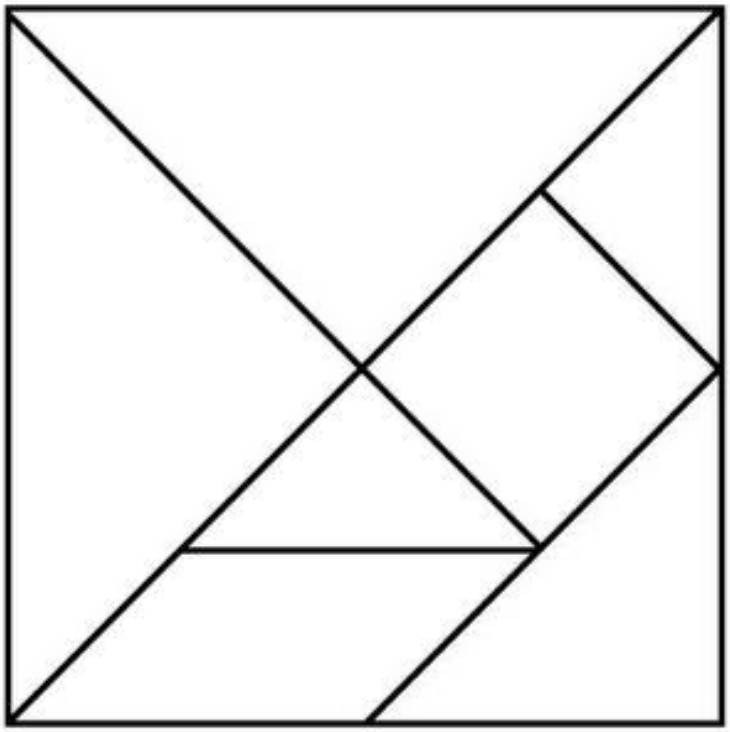
Summative: Collect the Tangram Task Sheet 1. Allow students to edit and rewrite their explanation to how they solved the problem. (They may have to resolve the task to edit and rewrite.)

Plans for Individual Differences
Intervention: Students who are having trouble with this activity may want to start with an easier puzzle or just a small section of the large square.

Extension: On Tangram Task Sheet 3, students can create their own puzzle and answer sheet.
Remind students that they need to be as accurate as possible when creating their own puzzle. Share their puzzles with others.

Tangram Sheet 1

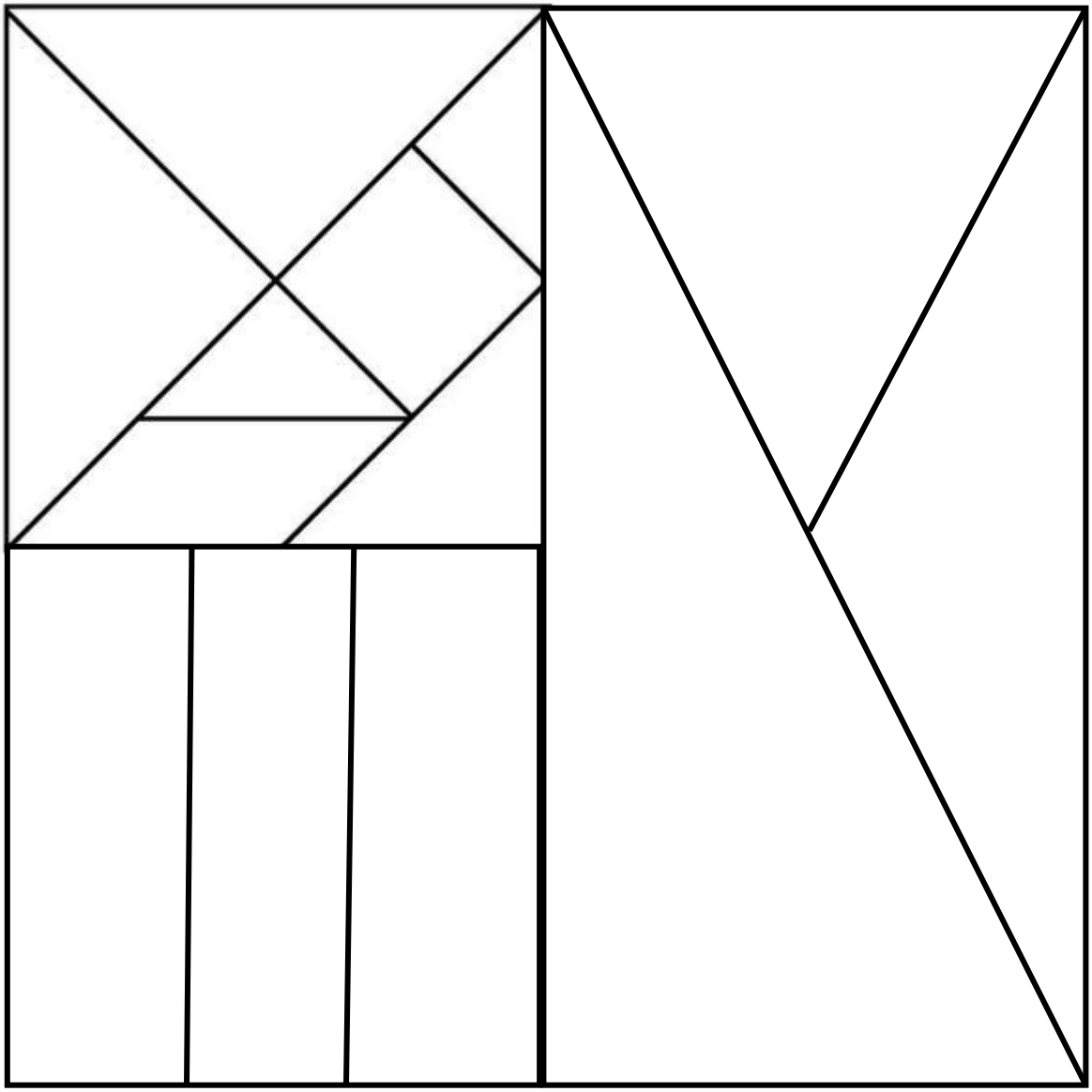
If the square is one whole, what is the value of each tangram piece in the picture below?



Explain how you found the answer for each piece:

Tangram Sheet 2

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



How did you discover the size of each piece?

Tangram Sheet 3

Create your own puzzle for a friend