

The teacher will need to see all of your work. Check (x) off each one as you use it. Be sure to include the following:

- Pictures, charts, graphs, or t-tables that support your explanation
- A written explanation with detailed sentences
- The equation or number sentence
- The answer (Ask yourself: Is my answer reasonable? Why or why not?)
- The solution in more than one way or related to other situations

Teacher Use Only

Analytical Score:

Understanding **N A P E**

Strategy/Reasoning **N A P E**

Communication **N A P E**

Holistic Score **N A P E**

Name: _____

Grade: _____

Date: _____

Teacher: _____

School: _____

Stained Glass Surprise

Amy's math class wanted to make her a special geometric surprise! They decided to make a mobile out of stained glass in the shapes and sizes of Tangram pieces.

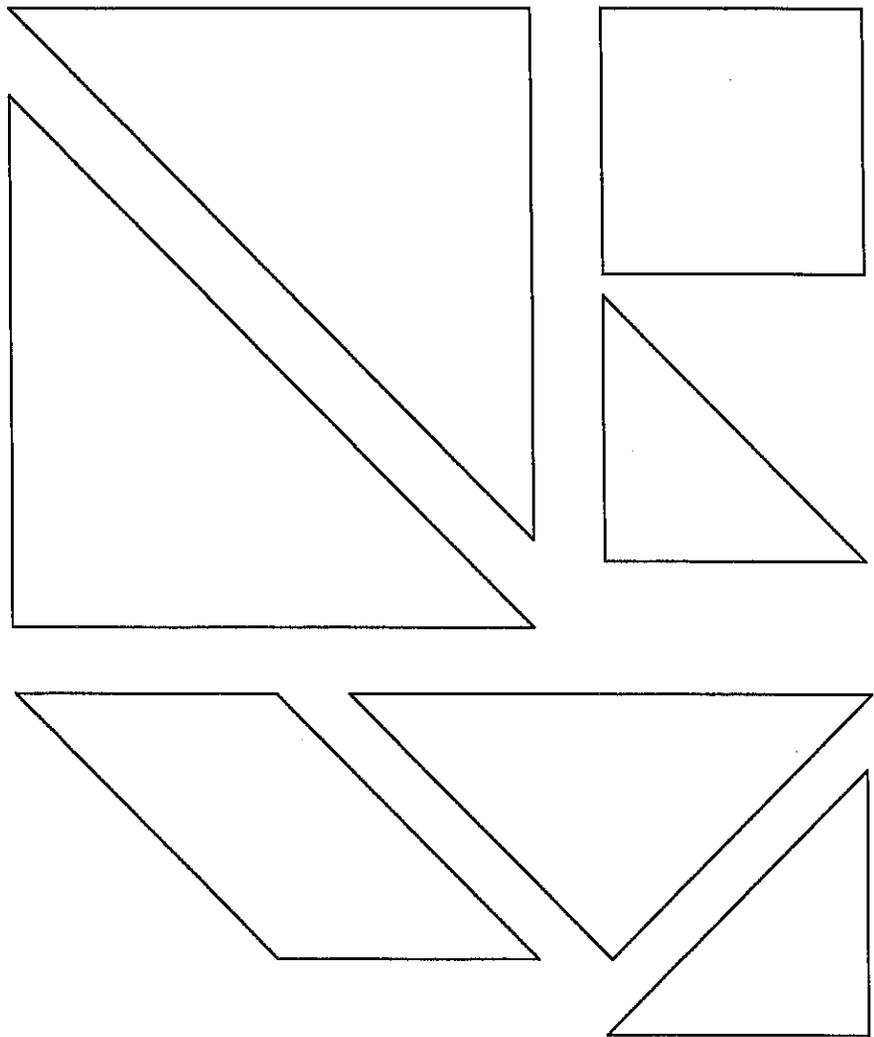
The glass for this project costs fifty cents for each three and one half centimeter square, (this is the same size of the square Tangram piece).

Using the information from above, figure the total cost of making the gift.

Remember to show how you solved the problem and make clear to the reader why you did what you did.

Tangrams

Instructions: Print and cut-out these tans. For best results, use heavy paper stock and a color printer



Rubric: Stained Glass Surprise

Key APS Mathematics Performance Standards: Third Grade

- Ⓐ) Compares and measures objects with respect to a given attribute (e.g., length, area, perimeter, volume, weight).
- Ⓑ) Selects and uses standard measurement units in everyday situations.
- Ⓒ) Uses money concepts in everyday situations and makes change for a variety of amounts up to \$1.00.

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
Novice	<ul style="list-style-type: none"> ❖ The student understands: <ul style="list-style-type: none"> • That s/he is making a mobile using the Tangram shapes. • That s/he needs to determine/compare the area of each shape to find the cost of the stained glass, but cannot make any connections to the size and shapes of the Tangram pieces. ❖ The student does not understand: <ul style="list-style-type: none"> • That the area of each $3\frac{1}{2}$ centimeter square costs 50¢, and connects that with the cost of the other Tangram shapes. • That s/he needs to calculate the total cost of the stained glass for the Tangram mobile. 	<ul style="list-style-type: none"> ❖ The student has started the task using Tangram manipulatives/representations, but does not use an effective strategy to determine the area of each of the Tangram shapes and the total cost of the stained glass. ❖ The student is developing their concept of shapes, measurement, size comparisons and area. Sample Strategy: The student plays with the Tangram manipulatives, traces some of the shapes onto the graph paper, and begins to make connections between the size of the square and the 2 small triangles. The student does not compare any of the other Tangram shapes. The student may write the cost of the square as 50¢, but will not connect this idea with any of the other shapes and does not calculate the cost of the stained glass. 	<ul style="list-style-type: none"> ❖ There is little or no communication, the student did not label the work, and/or their thinking is difficult to follow. ❖ Summary: The student cannot write/verbalize his/her final answer, and/or uses little or no math language and symbols to explain (in writing) how s/he determined or compared the area of each of the shapes and the cost of the stained glass. ❖ Representations: The student cannot represent the Tangram pieces using manipulatives/drawings, and has not created an efficient system (charts/t-tables/graphs) to compare the shapes of the Tangrams to each other to determine the area and cost of the stained glass.
Apprentice	<ul style="list-style-type: none"> ❖ The student understands: <ul style="list-style-type: none"> • That s/he is making a mobile using the Tangram shapes. • That s/he needs to determine/compare the area of each shape to find the cost of the stained glass. ❖ The student may not understand: <ul style="list-style-type: none"> • That the area of each $3\frac{1}{2}$ centimeter square costs 50¢, and connects that with the cost of the other Tangram shapes. • That s/he needs to calculate the total cost of the stained glass for the Tangram mobile. 	<ul style="list-style-type: none"> ❖ The student has started the task using Tangram manipulatives/representations, but does not use an effective strategy to determine the area of each of the Tangram shapes and the total cost of the stained glass. ❖ The student is developing their concept of area, measurement and the cost of the stained glass. Sample Strategy: The student plays with the Tangram manipulatives, traces the shapes onto the graph paper, and begins to make connections between the size of the square, the 2 small triangles, and the other Tangram shapes. The student cannot accurately determine the total cost of the stained glass. (Student may use the manipulatives to demonstrate the following comparisons.) <ul style="list-style-type: none"> 1 square = 2 small triangles 4 squares = 2 large triangles 2 small triangles = 1 medium triangle 	<ul style="list-style-type: none"> ❖ The student has communicated his/her understanding of the task by labeling their work, but the task is not clearly organized and the student's thinking is hard to follow. ❖ Summary: The student states his/her final answer and uses some math language and symbols to explain (in writing) how s/he determined ❖ Representations: The student can represent the Tangram pieces using manipulatives/drawings, but has not created an efficient system (charts/t-tables/graphs) to compare the shapes of the Tangrams to each other to determine the area and cost of the stained glass.

<p>Practitioner</p>	<p>Proficiency</p> <ul style="list-style-type: none"> ❖ The student understands: <ul style="list-style-type: none"> • That s/he is making a mobile using the Tangram shapes. • That s/he needs to determine/compare the area of each shape to find the cost of the stained glass. • That the area of each $3\frac{1}{2}$ centimeter square costs 50¢, and connects that with the cost of the other Tangram shapes. • That s/he needs to calculate the total cost of the stained glass for the Tangram mobile. 	<p>Proficiency</p> <ul style="list-style-type: none"> ❖ The student must have a correct solution and demonstrate one strategy that will determine the area of each of the Tangram shapes and the total cost of the stained glass. ❖ The student has a good understanding of the task and compares the size of the $3\frac{1}{2}$ centimeter Tangram square to the size of the other Tangram shapes to calculate the area and cost of the stained glass for the mobile. ❖ Sample Strategies: First I played with the Tangrams and then I traced them on the graph paper. I compared all of the shapes to the square because I know that the square cost 50¢. 1 square = 50¢ 1 square = 2 small triangles = 50¢ 4 squares = 2 large triangles = 50¢ + 50¢ + 50¢ + 50¢ = \$2.00 (I put the triangles together to make a large square, 4 of the small squares fit inside the large square.) 1 medium triangle = 2 small triangles = 1 square = 50¢ (I put the 2 small triangles together to make one medium triangle.) 1 parallelogram = 2 small triangles = 1 square = 50¢ (This was a hard one to see but once I put the 2 triangles together on top of the parallelogram I could see that it was the same size.) Total: \$2.00 + 50¢ + 50¢ + 50¢ + 50¢ = \$4.00 	<p>Proficiency</p> <ul style="list-style-type: none"> ❖ The student can represent his/her work in a clear, organized manner. ❖ Summary: The student states his/her final answer and uses appropriate math language and symbols to explain (in writing) how s/he determined or compared the area of each of the shapes and the cost of the stained glass. ❖ Representations: The student can represent the Tangram pieces using manipulatives/drawings, and has created an efficient system (charts/t-tables/graphs) to compare the shapes of the Tangrams to each other to determine the area and cost of the stained glass.
<p>Expert</p>	<ul style="list-style-type: none"> ❖ The student understands: <ul style="list-style-type: none"> • That s/he is making a mobile using the Tangram shapes. • That s/he needs to determine/compare the area of each shape to find the cost of the stained glass. • That the area of each $3\frac{1}{2}$ centimeter square costs 50¢. • That s/he needs to calculate the total cost of the stained glass for the Tangram mobile. ❖ Task Extension: The student includes a rule, equation, generalization, and/or observation (verbal or written) about their understanding of area and/or money. 	<ul style="list-style-type: none"> ❖ The student must have a correct solution and demonstrate one strategy that will determine the area of each of the Tangram shapes and the total cost of the stained glass for the mobile. ❖ The student has a good understanding of the task and compares the size of the $3\frac{1}{2}$ centimeter Tangram square to the size of the other Tangram shapes to calculate the area and cost of the stained glass. ❖ Sample Strategies: See the 'Practitioner' Strategy ❖ Task Extensions: The student makes a comparison using the Tangram manipulatives to the graph paper tracing to measure the area of the Tangram shapes. ❖ For Example: I compared the 2 small triangles to the square. They are the same size. The small square has about 12 squares inside of its shape on the graph paper, the 2 triangles also have 12 squares inside of their shape. 	<ul style="list-style-type: none"> ❖ The student can represent his/her work in a clear, organized manner. ❖ Summary: The student states his/her final answer and uses appropriate math language and symbols to explain (in writing) how s/he determined or compared the area of each of the shapes and the cost of the stained glass. ❖ Representations: The student can represent the Tangram pieces using manipulatives/drawings, and has created an efficient system (charts/t-tables/graphs) to compare the shapes of the Tangrams to each other to determine the area and cost of the stained glass. ❖ Task Extension: The student includes a rule, equation, generalization, and/or observation (verbal or written) about their understanding of area and/or money.