

Mathematics Governor's Institute 2003

Problem –in-a-Bag

Title: *The Quilt Maker's Gift*

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Grade: 2/3

Concepts Used: Geometry, Patterns, Measurement of Area

PA Standards Addressed:

Math

2.3 Measurement and Estimation

- A. Compare measurable characteristics of different objects on the same dimensions (area).
- B. Determine the measurement of objects with standard units.
(US customary)
- F. Use concrete objects to determine area and perimeter.
- G. Estimate and verify measurements.

2.9 Geometry

- A. Name and label geometric shapes in two and three dimensions (square, triangle)
- B. Build geometric shapes using concrete objects.
(manipulatives)
- E. Identify and draw lines of symmetry in geometric figures.

Reading

1.3 Reading, Analyzing and Interpreting Literature

E. Read and respond to nonfiction and fiction including poetry and drama.

1.6 Speaking and Listening

B. Listen to a selection of literature (fiction)

Relate it to similar experiences.

Predict what will happen next.

Retell a story in chronological order.

Recognize character and tone.

Identify and define new words and concept.

D. Contribute to discussions.

Ask relevant questions.

Respond with appropriate information or opinions to questions asked.

Listen to and acknowledge the contributions of others.

Display appropriate turn-taking behaviors.

E. Participate in small and large group discussions and presentations.

NCTM Standards

*Understanding patterns, relations, and functions.

*Analyze characteristics and properties of two dimensional geometric Shapes and develop mathematical arguments about geometric Relationships.

*Understand measurable attributes of objects and the units, systems, and processes of measurement.

Question:

Can the student determine the area of two dimensional shapes in a quilt square?

Model:

Use of manipulatives to create a two dimensional display.

Resources/ Materials:

- * **The Quilt Maker's Gift** by Jeff Brumbeau ISBN: 0-439-30910-7
Scholastic Publications
- * Quilt as an example
- * Variety of quilting books from the library
- * Standard measure ruler- school issue
- * Calculator- school issue
- * Glue Stick- \$.80
- * Colored Pencils Set- \$1.27
- * Directions Sheet: 8.5 x 11 white paper
- * Student Response Sheet 8.5x11 white paper
- * Student worksheet 8.5 x 11 white paper
- * Two dimensional geometric shapes in different sizes and colors- Oaktag
- * Twelve inch white unmarked square template- Oaktag
- * Twelve inch white square template with a designated amount of geometric shapes- Oaktag
- * Two gallon Zip Loc Bags \$2.50
- * Rubric 8.5 x 11 white paper

- * Websites:
 - <http://www.quiltmakersgift.com/gallery.html>
 - http://www.exemplars.com/math_rubric.html
 - <http://www.k12.hi.us/~waiialae.web/mathrub.html>

Introduction: (example)

“Have you ever given something special to someone else, something you really liked or made? Why did you do it? Was it for a friend or did the person really need it? How did it make you feel? We are going to explore the story “The Quilt Maker’s Gift” by Jeff Brumbeau, a story about a woman who creates beautiful, magical quilts for very special people.”

Read story. Conduct a discussion of similar experiences, retelling the story in chronological order, making a book to person, text or world connection.

“I brought a special quilt with me today that... was made for me by a quilt maker from Vermont. It was for my daughter when she was born. The quilt maker warned me not to put it on display, but to use it and to enjoy it.”

How might we use a quilt in our school? (Ask students for their ideas)

The quilt we are looking at is a combination of many different geometric shapes that create a particular design. Quilt makers take considerable time to lay out their design, attending to color, shapes, and patterns. Numerous designs can be created using the exact same shapes and colors. Sometimes you might need to make many sample designs or patterns before you find the one that is your favorite.”

Discussion also of the types of patterns they see in the quilt maker’s quilts. Review of math concepts including finding the area of triangles and squares.

Procedures & Activities:

Procedures

- * Discuss story.
- * Mini Lesson on calculating area of geometric shapes. (Review)
- * Warm-up Activity
- * Demonstration of math center activity where the child creates a symmetrical quilt pattern from two dimensional shapes and calculates the area of the various shapes.

Activities

- Read **The Quilt Maker's Gift**.
- Discussion of the story and geometric elements.
- Mini Lesson on Area and Symmetry
 - Review definitions of area and symmetry.
 - Review with students how to measure the area of a variety of shapes. Use overhead manipulatives to demonstrate.
 - Ask students if overhead examples are symmetrical examples.
- Warm-Up
 - Use classroom supply of two dimensional manipulatives to have students practice finding the area of the shapes. Use overhead manipulatives and have students share the way that they found the area of the shapes.
 - Discuss how they would find the area of multiple shapes and/ or colors.
- Math Center Activity (in two gallon Ziploc bag)
 - 12 inch square white oaktag board
 - colored oaktag two dimensional shapes
 - colored pencils, glue stick, standard ruler
 - direction sheet
 - student response sheet
 - student worksheet
 - rubric

Additional Activities (if needed)

Quilt KWL

Create a Quilting Dictionary

Memory Game- **In My Grandmother's Attic**

Quilt Pattern Sheets to Color

Create a real quilt HIV/Aids children, SOS Children's Villages, New York Cares or another group.

Authors and Artists

Quilting Newsletter

Direction Sheet

A Gift for the School

The building principal has asked teachers for some student created art work to display in the commons area of the school. Ms. Wilson thinks that one of the math activities designed around the story “**The Quilt Maker’s Gift**” would make an appropriate gift for the school. The classroom is going to do a paper quilt together as their gift to the school.

Directions:

1. **Take out the white quilt template.**
2. **Choose 3 colors and as many pieces as you wish.**
3. **The white template may show when you are done or you may cover the entire white area.
White does not count as an area of color.**
4. **Create a design on the white template using the three colors.**
5. **Determine the total area of each color used.**
6. **Answer the questions 1-4 on the student response sheet.**
7. **Glue your shapes onto the quilt template to complete your design.**
8. **Write your name on the back of your quilt design.**

Things for You to Consider:

What do you want your design to look like using just squares and triangles on the 12 inch white square?

You will only be using three colors from the list below.

red, blue, black, green, and yellow

You will need to complete the Student Response Sheet.

You may leave some white oaktag showing in the design if you choose.

Student Response Sheet

Name _____

Date _____

Please answer the questions after you have completed your design and the Student Worksheet. Your answers should be in complete sentences.

1. How many lines of symmetry do you see in your design?

2. Name the attributes of the shapes used in your design.

**name of shape
color
size (large, small)
number**

3. What is the area of each of your three colors?

Color _____ Area _____

Color _____ Area _____

Color _____ Area _____

4. Calculate the area of “white” left on your quilt square and explain the strategy used. Please use the back of this sheet for your explanation.

Student Worksheet

Name _____

Date _____

Please complete this worksheet before completing the Student Response Sheet. Remember that you find the area of a shape by multiplying the length times the width of the shape.

	Color A	Color B	Color C
	_____	_____	_____
Area of Triangles	_____	_____	_____
Area of Squares	_____	_____	_____

Area Totals:

Color A _____

Color B _____

Color C _____

Please note: 2 large triangles = 1 large square

4 small triangles = 1 large square

Area (rectangle) = length X width

Quilt Square Assessment Rubric

- * The student ... **Score 5.**
used 3 colors in the design.
calculated the area of all three colors in the design accurately.
completed both the worksheet and the response sheet accurately.
signed his/her name on the back of the template.

- * The student... **Score 4.**
used 3 colors in the design.
calculated the area of all three colors in the design accurately.
completed both the worksheet and the response sheet.
signed his/her name on the back of the template.

- * The student... **Score 3**
used 3 colors in the design.
calculated the area of 3 colors in the design.
completed both the worksheet and the response sheet.
signed his/her name on the template.

- * The student... **Score 2**
completed a design.
attempted to calculate the area of the two colors in the design.
completed some of the worksheet and the response sheet.
signed his/her name on the template.

- * The student... **Score 1**
completed a design.
did not calculate the area of the colors on the design.
did not complete the worksheet or the response sheet.
did not sign his/her name.

- * The student... **Score 0**
did not complete a design, calculate the area, complete the worksheets
or sign his/her name.