

TOPIC: Geometry, Patchwork Quilts, and Native American Culture

NCTM STANDARDS: Geometry, Measurement, Connections, Communication

GOALS:

Students will connect geometry, patchwork quilts, and Native American culture. They will review basic geometry concepts of area, perimeter, and symmetry in the context of Native American quilts.

INTRODUCTION:

Star quilts are important in Native American culture. Stars are a part of the spiritual tradition in many different tribes. They are believed to be sent by the Great Spirit to watch over the people and to give blessings. Early Indian artifacts frequently included drawings of stars. When Indian women learned the craft of quilting from the pioneer women, star patchwork patterns became favorites. In addition to being used in many homes as bed coverings, star quilts are given as gifts to show respect and honor. They are also used for ceremonial purposes, including births, marriages and deaths. One of the most popular of the Indian star quilts is the Morning Star.

ACTIVITIES:

- Part 1. Introduction. Students research Native American Morning Star Quilts on the Internet. They take notes and discuss the quilts' history and cultural significance. They also construct a paper version of a Morning Star block.
- Part 2. Area and Perimeter. Using the "real-life" Morning Star Block, students determine how many squares would be required to make a full quilt (approximately 80 inches by 80 inches) and sketch the full quilt. Students investigate perimeter and area of each block and of the full quilt.
- Part 3. Symmetry. Students examine their Morning Star Block pattern to determine whether it has one or more lines of symmetry, and whether it has rotational symmetry. They sketch the block and show the symmetry.

ASSESSMENT: At the end of the activity, students write a reflection describing the connections between patchwork quilts, Native American culture, and geometry concepts.

Part 1. Introduction.

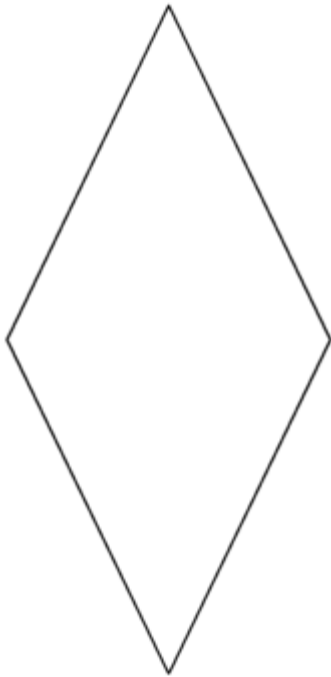
The Morning Star Quilt pattern is significant in Native American culture. Explore the following websites to learn about Morning Star Quilt pattern. You may also do a search for further information. Be prepared to discuss the history of the Morning Star Quilt pattern and its relation to Native American culture.

<http://www.bluecloud.org/morningstar.html>

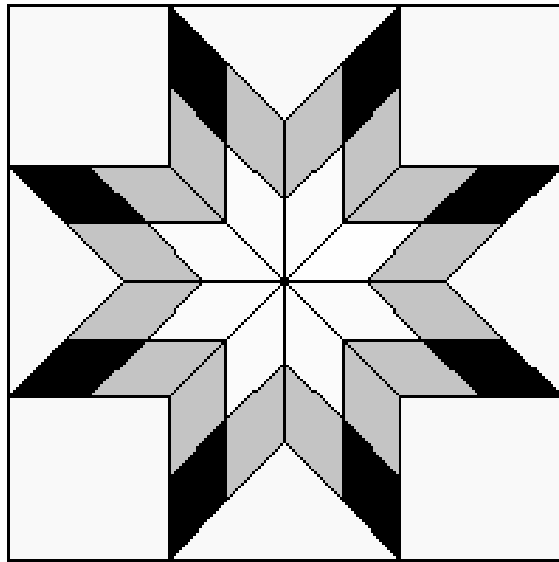
http://www.womenfolk.com/quilting_history/nativeam.htm

<http://www.native-american-star-quilts.com/>

Trace the diamond below and make a pattern of cardboard or heavy paper. Trace around this diamond to make the Morning Star Quilt on large art paper, drawing lines to mark the outside border as below. Color the diamonds to make your own pattern.



Diamond



Morning Star Quilt

Part 2. Area and Perimeter.

Examine the Star Block.

1. What is the measure of each of the sides of your Star Block?
2. What is the perimeter of your Star Block?
3. What is the area of your Star Block?
4. How many squares would you need to make a full quilt that is approximately 80 inches by 80 inches? Sketch it.
5. What is the perimeter of your full quilt?
6. What is the area of your full quilt?
7. What is the relationship of the perimeter of the small block to the perimeter of the full quilt?
8. What is the relationship of the area of the small block to the area of the full quilt?
9. Are these two relationships the same or different? Explain why.

Part 3. Symmetry.

Examine the Star Block.

1. Does your Star Block have line symmetry?
2. How many lines of symmetry does it have?
3. Sketch your block, and draw in all lines of symmetry. Label the type of symmetry.
4. Does your Star Block have rotational symmetry?
5. How many different turns can it make and be symmetric?
6. Sketch your block, and describe its rotations.

Part 4. Assessment.

Write a reflection describing the connections between patchwork quilts, Native American culture, and geometry concepts.

NCCTM 2006 - Celebrating Culture through Mathematics

TEACHER NOTES/SOLUTIONS

Part 1. After students have researched this topic on the Internet and taken notes, lead a class discussion on the history and tradition of Native American quilts. Display student-created quilt squares in the classroom, on a bulletin board or other space.

Part 2. 1. 16 in., 2. 64 in., 3. 256 sq. in., 4. 25 It would be 5 x 5, 5. 320 in., 6. 6400 sq. in., 7. 1/5, 8. 1/25

Part 3. 1. yes, 2. 8, 4. yes, 5. 4

Part 4.

Rubric for Assessing Reflection

	Strong	Adequate	Weak
Introduction	5 4 Topic is introduced in interesting manner, clearly stated. Strong sense of writer's purpose.	3 2 Topic is introduced in somewhat interesting manner, clearly stated. Some sense of writer's purpose.	1 0 Broad, unfocused introduction. Ideas lack interest, originality, and perception. No sense of writer's purpose
Thoughtfulness	5 4 Thoughtful and complete. Student clearly understands both the mathematics and the culture, and clearly connected them.	3 2 Somewhat thoughtful and mostly complete. Student seems to understand both the mathematics and the culture, and made some connections.	1 0 Writing does not reflect thought and may be incomplete. Student lacks understanding of the mathematics and/or the culture, and failed to connect them.
Details and Examples	5 4 Generous use of concrete details and examples.	3 2 Some details and examples.	1 0 No use of details or examples to explain generalizations.
Mechanics	5 4 Writing is clear and effective. No major errors in spelling, punctuation, or grammar. Neatly typed or handwritten.	3 2 Writing is mostly clear and effective. Few errors in spelling, punctuation, or grammar. Neatly typed or handwritten.	1 0 Writing is not clear . Major errors in spelling, punctuation, or grammar. Not neatly typed or handwritten.