Algebra/Geometry Institute Summer 2002

Quilt Geometry I

Faculty Name: Sarah Fleeman
School: South Delta Middle School
Grade Level: 7

1 Teaching objective(s)

Mississippi State Mathematics Framework Competencies

2 e. recognize and extend patterns
5 a. identify polygons to twelve sides.
5 h. identify congruent segments, angles, and polygons. (introduced previously)
5 k. investigate the symmetry of polygons
identify similar polygons

2 Instructional Activities

Teacher Activities

- The teacher will begin the lesson by reading *The Seasons Sewn* by Ann Whitford Paul to students while showing the illustrations of the various quilt patterns as part of a Microsoft PowerPoint presentation.
- The teacher will lead students in a discussion of several of the pictured quilt designs, then ask students to name the polygons used to create the design.
- The teacher will use the PowerPoint presentation to explain line of symmetry then ask students to find the lines of symmetry in a design, define and ask students to identify similar and congruent polygons, and guide students to recognize and discuss the visual patterns in the designs.
- The teacher will then tell students they will be investigating more quilt patterns by completing an internet activity
- The teacher will distribute copies of "Exploring Quilt Geometry", assign individuals or groups (depending on the number of computers available) to computers, and monitor students as they complete the activity.

Student Activities

- Students will listen to the reading of *The Seasons Sewn*.
- Students will participate in class discussion of the polygons, lines of symmetry, similar and congruent polygons, and patterns in the pictured designs.
- Students will complete the internet activity "Exploring Quilt Geometry"
- Students will present their completed activity to the class.

3 Materials and Resources

- *The Seasons Sewn* by Ann Whitford Paul [ISBN 0-15-276918-8]

- Computer diskettes with "Exploring Quilt Geometry" loaded as a template or printed copies of the activity
- Computers with access to the World Wide Web
- Presentation software such as Microsoft PowerPoint
- Projection device or tv-computer connection
- *Middle Grades Math Tools for Success Course2* Prentice Hall Inc. 2001 "Lesson 7-1 Exploring Visual Patterns" p288.

4 Assessment

- The teacher will evaluate student understanding of the concepts discussed during the presentation at the beginning of class through questioning.
- The teacher will evaluate student work on "Exploring Quilt Geometry" according to a rubric.

5 Enrichment (Optional)

- Students may complete another internet activity
  Quilting Our Way Through Geometry
  http://its.guilford.k12.nc.us/webquests/quilts/quilts.htm
  This activity is a web quest.
- Students may also try one of Math Forum's problems of the week
  Quilting: The Mariner's Compass
  http://mathforum.org/pow/solutio58.html

Exploring Quilt Geometry

You are going to be visiting the American Archive of Quilt Design web site to explore some quilt designs to look for some of the geometric concepts we have studied. You will need to read and follow all directions carefully.

Before you begin to answer questions, save this file to your 3 ½" floppy disk. Click file, save as, choose 3½ A in the save in box. Find the file name box at the bottom of the save dialog box. Place your cursor at the end of the last word in that box and left click twice. Type your name.
Click Save. ***Save often!***

Click on the blue link below. This will take you to the Quilt Design Archive.
http://www.womensearlyart.net/quilts/

1. You will see a large picture of a quilt block. Under that picture is a list of design names in alphabetical order. To see a picture of that design, click on the blue title. Look at several different designs. What shape/s do you see used most often?
   Why do you think this is so?

2. Choose one of your favorite designs. Copy and paste it below this line.

3. What is the name of the quilt design you chose?
   Why do you think this name was chosen for this design?

4. Name all of the polygons used in this design.

5. Describe the pattern used in this design. Tell how the shapes were combined to create the square.

6. Does your design have congruent polygons?

Tell the names of the congruent polygons and their location in the design.

7. Does your design have any similar polygons?

   Tell the names of the similar polygons and their location in the design.

8. Does your quilt design have a line of symmetry? If yes, does it have more than one?

9. Copy and paste your design again below this line.

10. Draw all the lines of symmetry in your design.

11. Now imagine a whole quilt made of squares like yours. Use quadrille grid paper to show how the large quilt might look. Use a block of 4 by 4 squares (16 small squares) on your grid paper to represent one block of your quilt design. You may make your quilt as large as the paper allows, but be careful to keep the pattern throughout. Use colored pencils to shade your design as closely as possible to the pattern of colors used in the original.

12. Be prepared to present your completed work to the class.

Scoring Rubric
For
Exploring Quilt Geometry

4- You completed all parts of the assignment correctly. You followed all directions. Your answers show clearly that you fully understand congruence, similarity, and symmetry, and that you can recognize and extend a pattern. You used correct mathematical terminology in all answers. Your work is neatly presented with no errors in spelling or grammar.

3- You completed most parts of the assignment correctly. You followed most of the directions. Your answers show that you have some understanding of the terms above, and that you can recognize a pattern. You made some attempt at using correct mathematical terminology. Your work shows some effort at neatness. You have only minor errors in spelling and grammar.

2- You completed most of the assignment. Some of your answers are correct. You tried to follow directions. Your answers show that you understand some of the terms. You have several mistakes in the terminology used and in spelling and grammar.

1- You completed some of the assignment. You have a few answers correct. You have many mistakes in spelling and grammar.