

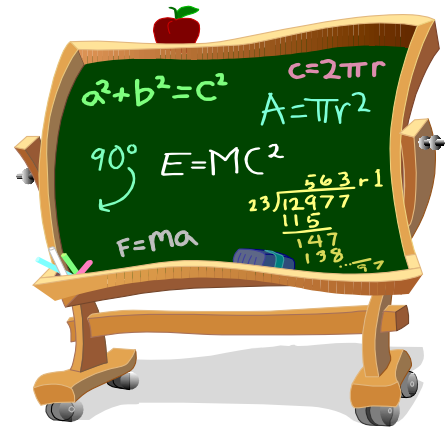
## Algebra/Geometry Institute Summer 2004

### Lesson Plan 2

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School: Gentry High School, Indianola, Mississippi

Grade Level: 7<sup>th</sup> – 8<sup>th</sup>



#### 1 Teaching objective(s)

The students will explore geometric patterns and relationships. More specifically, the students will explore lines of symmetry.

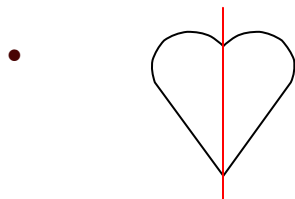
#### 2 Instructional Activities

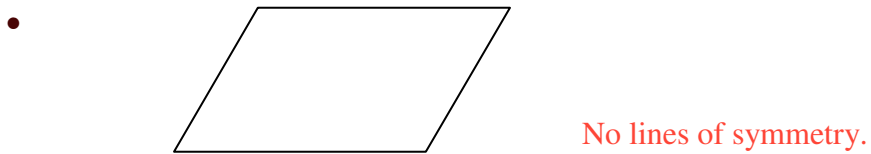
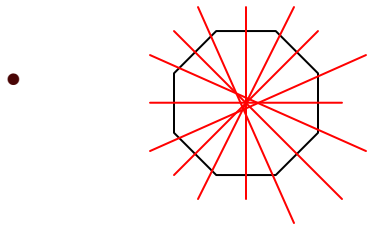
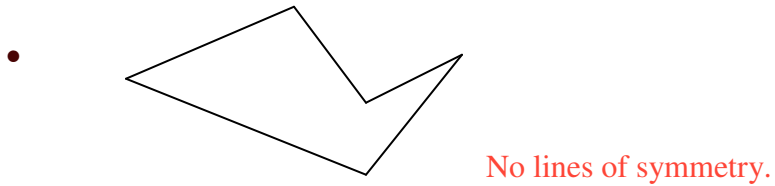
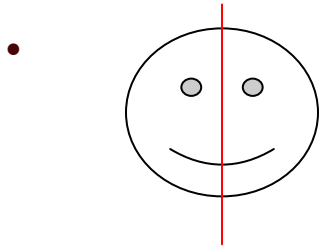
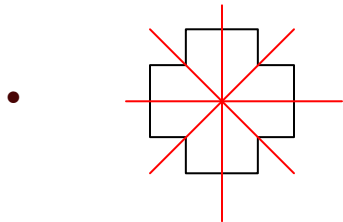
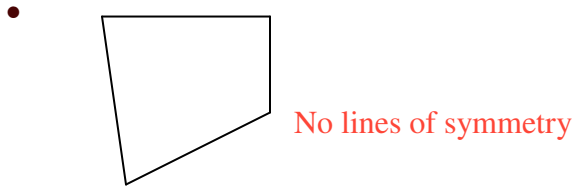
Open the lesson with the following activity.

- Pass out to each student a cut out of a rectangle, square, circle and some other random shape or letter. (You can use die cut outs or see attached.)
- Ask the students to fold the rectangle in half long ways (horizontal), then up and down (vertical) and then on a diagonal. Ask them after each fold if the paper fits exactly on top of the other half.
- Repeat the step above for the square and the circle. (Make note that the circle has infinitely many lines of symmetry.)
- Say, “An object is said to have line symmetry if it can be folded in half and fit exactly over the other half. The line on which it folds is called the line of symmetry.”
- Call on students and ask him or her what their other shape is. (You can use letters and other shapes such as trucks, cars, butterflies, etc...) Have them tell the class whether it has a line of symmetry. If so, how many?

**(10-15 minutes)**

Next, put several examples on the overhead. Ask the students to identify the line(s) of symmetry, if any. (Be sure to clear up any confusion on the line that simply divides the figure into two equal areas rather than folding and fitting exactly on top of each other.) **Answers in red.**





Note: The parallelogram is usually hard for the students to *see*. You may need to cut one out and actually show the students that the two halves do not fit on top of each other.

**(10-15 minutes)**

Say, “When you look in a mirror, you see a reflection of yourself. A mirror image or reflection is used as the basis for many designs. We are going to use Miras (transparent mirrors) to complete figures.”

- Pass out the “Native American Quilt Making” Activity Sheet (see attached) to each student.
- Instruct them to place the Mira on the line of symmetry and complete each figure. (The transparent mirrors reflect the image onto the other half of the paper. The students trace the reflection. When they remove the Mira, the figure is complete.)
- On the last page, the students are asked to design their own template.
- When the students are finished, discuss the other lines of symmetry they found using the Mira.

Note: This activity sheet is a good way to incorporate multiculturalism into your classroom.  
**(15-20 minutes)**

Extensions of Today’s Lesson:

- If any student seems really interested in the art aspect of the activity, tell them they can draw a picture of anything that has symmetry. You can decorate your bulletin board with their pictures. (Reward their efforts however you choose.)

### 3 Materials and Resources

Overhead

Markers/Chalk

Die Cut Outs

“Native American Quilt Making” Activity Sheets

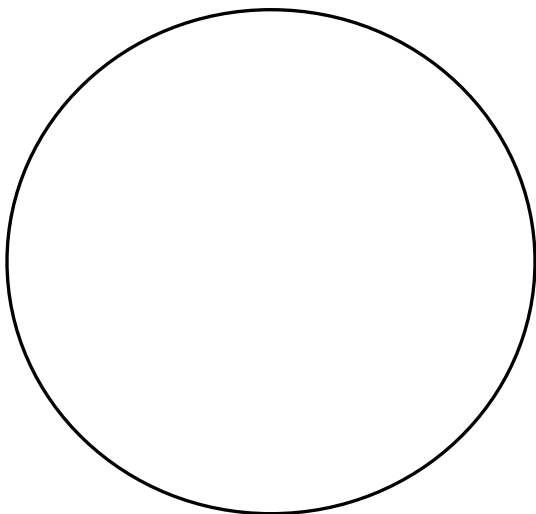
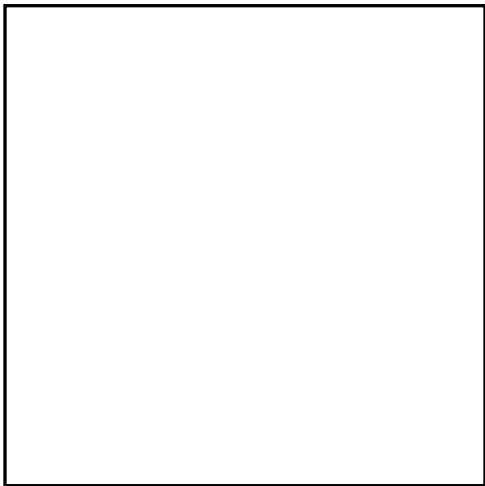
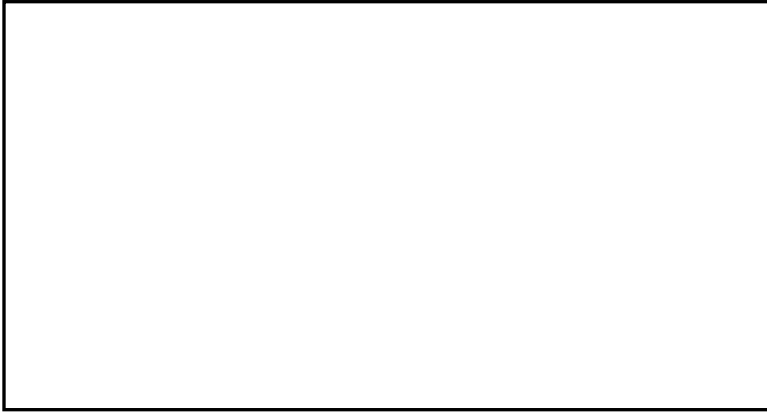
Miras (A Registered Trademark of the Math Mira Company)

Textbook: Littell, McDougal and Houghton Mifflin; Mathematical Connections: A Bridge to Algebra and Geometry; Copyright 1997.

### 4 Assessment

- As the students are working on their activity sheets, the teacher will walk around the room and observe the students. He/she will be looking for: students working and students understanding the concept.
- The activity sheets will be taken up and graded.
- The concept covered will be on the chapter test.

## Die Cut Outs



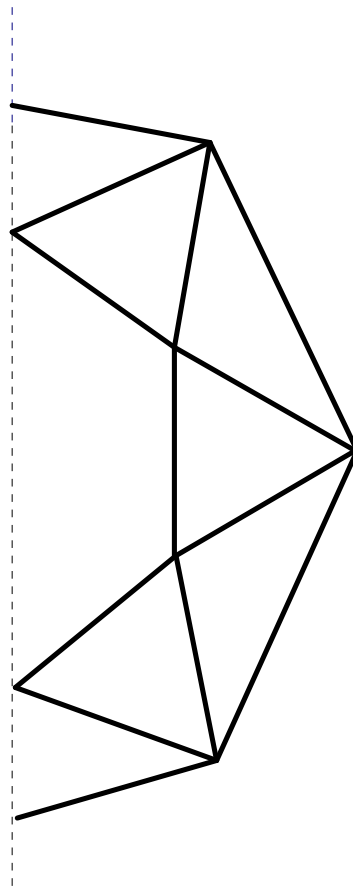
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## Native American Quilt Making

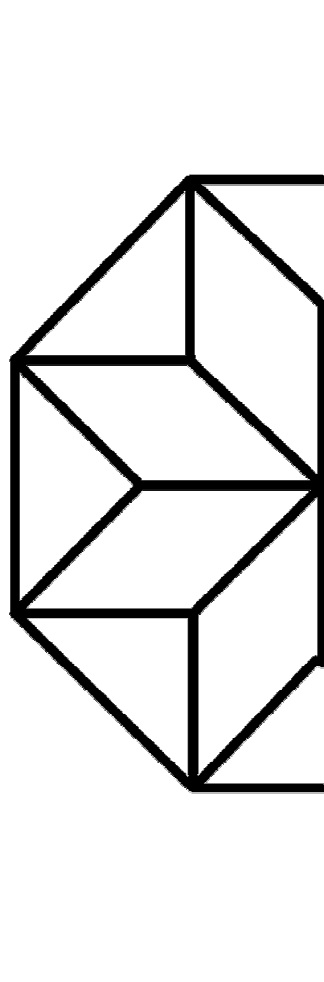
A craftsperson is skilled to make things by hand rather than by a machine. Making a craft that has traditional designs usually requires some knowledge of line symmetry. Native American quilting is an example of the many crafts that preserve their cultural heritage.

Each of the following is a sketch of the basic template for a quilt design. Use the transparent mirror to complete each design. Once the design is complete, use the transparent mirror to locate and draw all lines of symmetry.

1.



2.



Draw your own template and then use the transparent mirror to complete the design. Once the design is complete, use the transparent mirror to locate and draw all lines of symmetry.