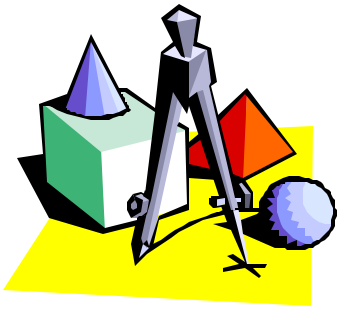
Algebra/Geometry Institute Summer 2003

Lesson Plan Two – Fun With Symmetry



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City: Greenwood
Grade Level: 7th

1. **Teaching Objective(s) – To investigate symmetry of polygons**
2. **Instructional Activities – I use the following activities to introduce the concept of symmetry to my students. (1.) Give each student a sheet of construction paper. Have the students fold the paper in half and crease it several times. Tell the students to open up the paper and make a heavy, dark line over the creased line. Explain to the students that the line they drew is called a line of symmetry. Next, go around the room and pour a small amount of paint on each student's piece of construction paper. Have the students fold their paper back in half and rub it all over so that the paint will spread out. Then have them open up their papers and look at the design they have made with the paint. Ask them if both sides of their design look alike. (They should, unless some of the paint ran – only give a small amount.) Allow the students to go around the room and look at each other's designs. Tell the students to look at each design's line of symmetry. Ask them what it does to their designs. The students should come to the conclusion that it divides the design into two equal parts. Have the students put the definition of symmetry into their vocabulary notebooks. The definition that is given in Prentice Hall's Middle Grades Math Course 2 (the series we use) is as follows: Symmetry – A figure is symmetrical about a line when one side is a mirror image of the other side. Ask the students to look at their designs again and to decide if each side is a mirror image of the other side. If they are, they have made a symmetrical design. (2.) Assign partners to do this next activity. Tell the students to write the letters of the alphabet in manuscript capitals on their paper. (Examples: A, B, C…) They are to decide which letters are symmetrical and list their answers. Allow time for the partners to complete the activity and call on different students to put up their results and let the class decide if they are correct. (3) Pass out a sheet of paper with different polygons drawn on it to each student. (Examples to use: an isosceles triangle, an equilateral triangle, a square, a rectangle, a rhombus, a regular hexagon, a regular octagon, and several other polygons that do not have any lines of symmetry.) Have the students cut out the polygons. Work with the students on folding each of the figures exactly in half. Tell the students that some polygons have more than one line**

of symmetry and some polygons do not have any lines of symmetry. Hold up the folded isosceles triangle and ask the class if they think it can be folded exactly in half again. (No) Have the students open up the isosceles triangle and draw the line of symmetry they made when they folded it. Next use the equilateral triangle. Have the students fold it exactly in half. Tell them to unfold the triangle and see if they could have folded it in half a different way. (Yes) Have them do the fold and then unfold it again. Ask the students if there is another way they could have folded the triangle in half. (Yes) Have the students fold the triangle in half for the third time and then to unfold it again. Call the students' attention to the three lines of symmetry that they have made and have them draw them with a dark line. Have the students work in groups to finish the rest of the polygons. Make a chart and put their results on the board. Have the students copy the chart into their notebooks. (Copy of a sample chart is included for this activity.) (4) The next day we would do the lesson that is presented in my book and use the worksheets that are also provided that go along with the lesson as an assessment.

3. **Materials and Resources – Construction paper, markers, worksheets containing the polygons to be cut out, scissors, notebooks, and pencils. I will also use the lesson on symmetry that is given in the textbook my school uses, Prentice Hall's Middle Grade Math Course 2, copyrighted 2001.**
4. **Assessment – Informal evaluations of the students' abilities to identify the lines of symmetry of the different polygons will be made by the teacher as the different activities are completed. For the formal assessment, I will ask the students to write in their journals. They are to give an explanation on how to find a line of symmetry for any polygon and to illustrate their explanation.**

How Many Lines Of Symmetry Do I Have?

NAME OF POLYGON	DRAW THE POLYGON WITH LINES OF SYMMETRY	NUMBER OF LINES OF SYMMETRY