"Using Pattern Blocks to Teach Math"

I. Goal/Objective

a. The goal of this staff development is to teach/show teachers the effectiveness of using pattern blocks (manipulatives) when teaching mathematics.
b. (Ms 5) Interpret and analyze data and make predictions.
    i. (Ms 5.a) Compare data and interpret quantities represented on tables and graphs, including line graphs, stem-and-leaf plots, histograms, and box-and-whiskers plots to make predictions, and solve problems based on the information. (DOK 2)

II. Math Concepts

a. Using manipulatives to identify fractional parts of a whole.
b. Manipulative, when used to introduce concepts about fractions, help students understand the ideas about fractions.
c. Pattern blocks and fractions have many uses in learning mathematical concepts, but they are especially useful in learning about fractions.

III. Materials

a. Pattern blocks
b. Overhead Projector
c. Overhead Pattern Blocks
d. Crayons
e. Ruler (If Needed)

IV. Management

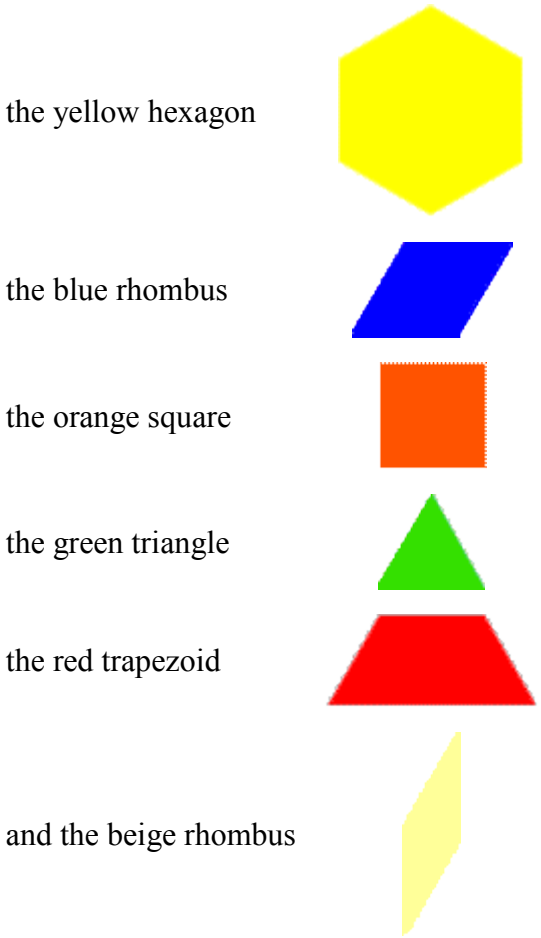
a. Things to prepare ahead of time
    i. See the principal to schedule a date for this staff development.
    ii. Make pattern blocks, crayons, rulers, available at each of the six tables.
    iii. Make paper and pencil available for the use of tracing.

b. Participants groupings
    i. I will have six tables. Each table will represent a different color (red, yellow, green, black and blue).
    ii. Place six color tiles of each of the four colors in a jar.
    iii. As participants enter the room, ask them to choose a color tile from the jar without looking.
    iv. The color tile the participant chooses will determine the table/group they belong.

c. Time frame
    i. The approximate time for the entire activity is 30-45 minutes.

V. Procedure.

a. Introduction
    i. For those teachers unfamiliar with pattern blocks, remind them that each block represents something (e.g., Patterns blocks are one centimeter thick multicolored blocks that comes in six shapes; hexagons, squares, trapezoids, triangles, Parallelograms, and rhombi).



ii. For ease in identification, each shape is made of only one color.
    1. Hexagon (yellow), rhombus (blue), square (orange), triangle (green), trapezoid (red), small rhombus (beige).-.

b. Content Activity (Lesson One: Introduction to Fractions)
    i. Tell teachers that today they will be using pattern block to introduce the concept of fractions.
    ii. The presenter first writes the word "whole'" and discusses with the teachers what a whole means to them. Then the idea of fractions is introduced, being a part of a whole.
    iii. On the overhead the teacher then displays the hexagon and states, "This is the whole." Teachers follow at the table.
    iv. The presenter then asks, "Can you make more wholes, yellow hexagons, using only one color to make it again?
        1. Teachers work to build using pieces of the same color to duplicate the hexagon.
        2. After all teachers have built more hexagons, they will discuss and name the fractions.
            a. As this is done the concept of a numerator and denominator are revealed, introducing the math vocabulary terms.

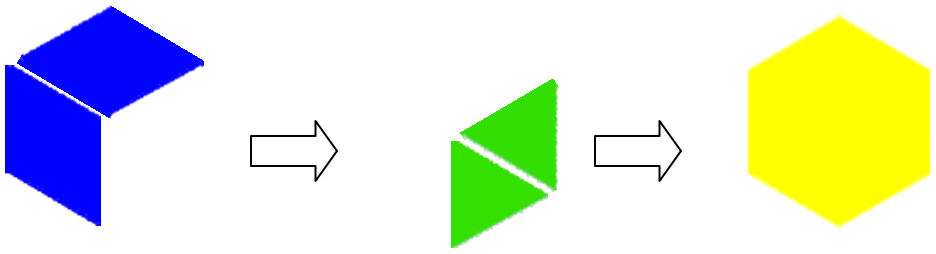
3. The presenter will say, "Let's look at how we made more hexagons."
    a. How many red shapes make a whole? Two. [Introduce how fractions are written].
    b. The presenter will model to the teachers how to introduce fraction concepts, vocabulary, numerator & denominator, etc.
        i. Ex. Each red trapezoid is called a half in relationship to the hexagon.
        ii. Have teachers work in groups with the blocks. Have the teachers discover the relationship between these 6 blocks:
        iii. The presenter may consider the following questions:
            1. How many green triangles are in one blue rhombus ?
            2. The green triangle is what fraction of the blue rhombus ?
            3. How many green triangles are in one red trapezoid ?
            4. The green triangle is what fraction of the red trapezoid ?
            5. How many green triangles are in one yellow hexagon ?
            6. The green triangle is what fraction of the yellow hexagon ?
            7. How many blue rhombuses are in one yellow hexagon ?
            8. The blue rhombus is what fraction of the yellow hexagon ?
            9. How many red trapezoids are in one yellow hexagon ?
            10. The red trapezoid is what fraction of the yellow hexagon ?
        iv. The bottom number is the total number of pieces needed to make the whole and the top number is how many we are talking about, one over two, one half.
        v. Repeat this for thirds and sixths.

c. Content Activity (Lesson two: Adding Fractions)
    i. Have teachers use patterns blocks to model the following problem:

1. Example: If is one whole, what pattern blocks can I use to cover the whole?
2. Ask teachers if they can "replace" blocks so that all the blocks are the same.
    a. Ask the teacher what fraction of the whole does this represent?
    b. 3 Rhombi can cover this hexagon.
        i. One rhombus is 1/3 of the whole.
    c. 6 triangles can cover this hexagon.
        i. One triangle is 1/5 of the whole.
    d. 2 trapezoids can cover the hexagon.
        i. One trapezoid is ½ of the whole.
3. Notice that the word "addition" has not been used yet.

ii. At this point, the presenter may wish to write the following on the overhead: 2/3 + 2/6 = 1 and show with the pattern blocks as displayed in figure 1.

Fg. 1



2/3 + 2/6 = 1 Whole

(Two Rhombi of the rhombi) + (Two Triangles of the six triangles) = 1 Whole

1. Tells teachers that you have just introduced them to adding fractions using pattern blocks.
2. As the teachers become more proficient, start off by writing the equation on the overhead and ask which blocks are needed to represent this equation: 2/3 + 1/6=
    a. You may discover that the teachers become very good at visually "seeing" the answer.

iii. Presenter will also suggest to teachers that you can use Patterns blocks to add, subtract, multiply, and divide fractions.

VI. Closure

a. Ask teacher if they enjoyed working with the pattern blocks.
b. Ask teacher to share if they think their students would enjoy using pattern blocks.

c. Ask teachers to share whether or not they will use pattern blocks to teach a math concept in the classroom.