Mississippi Mathematics Manipulatives Manual
Featured Activity

"Parts of a Whole"

2.G.3

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As we continue our efforts to develop high-quality instructional materials (HQIM) and resources, the Mississippi Department of Education (MDE), through the Academic Education Office, would like to showcase instructional practices and activities that foster conceptual understanding through the use of manipulatives in the mathematics classroom.

The **Mississippi Mathematics Manipulatives Manual** features activities meant to serve as short, hands-on procedures that may be implemented before, during, or after a lesson to support the teaching and learning process of the Mississippi College- and Career-Readiness Standards (MCCRS) for Mathematics. Alignment with the MCCRS Scaffolding Document has been included for additional support. Teachers may contact staff at the MDE if they would like to borrow manipulatives for classroom use.

Teachers may modify these activities to meet the needs of the students they serve and their instructional delivery model (virtual, in-person, or hybrid).

Special Thanks:
Lori Hamill
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Parts of a Whole

MANIPULATIVE(S):

- Pattern Blocks

GRADE LEVEL OR COURSE TITLE:

CCR Mathematics Grade 2

DOMAIN AND CLUSTER HEADING:

Geometry (G):

Reason with shapes and their attributes

STANDARD(S):

2.G.3: Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

PREREQUISITE SKILLS:

1. Know the concept of equal parts.
2. Know the meaning of half.
3. Decompose figures into equal shares making smaller shares.
4. Model and draw to make figures represent fractions.

ACTIVITY: Note: Activity Sheets Attached

1. Pair students with a partner and provide each student with a set of pattern blocks and a "Parts of a Whole" Activity Sheet *(Attached)*.
   Note: For a virtual option, students may visit https://toytheater.com/pattern-blocks/.
2. In a whole group setting, introduce the different shapes that come with the pattern block kit: green triangles, orange squares, blue parallelograms, tan rhombuses, red trapezoids, and yellow hexagons.
3. Display a hexagon and identify it as a "whole."
4. Ask students, "How many trapezoids will it take to cover the hexagon?" Allow students time to use their blocks to determine their answer. Look for the answer "2." Then, explain that 1 whole = 2/2, so each trapezoid is one-half of the whole. It takes 2 halves to make a whole.
5. Ask if any shape can be used 3 times to create the hexagon. Allow students time to experiment with the shapes. Look for the answer, "3 parallelograms." Explain, that it will take 3 parallelograms to create the hexagon. That means that the "whole" is 3/3 or three-thirds.
6. Instruct students to take one parallelogram away. Ask, "What part of the hexagon is blue?" Answer: ⅔ is blue and ⅓ is yellow.

7. Then, ask, "Is there a way to cover the hexagon with only 4 shapes?" Look for the answer, "No." Explain that to use the term fourths, you must be able to cover the given area completely with four pieces of the same shape.
8. Have student lay out a trapezoid in front of them. Ask students, "How many triangles does it take to cover the trapezoid?" Look for the answer, "3." Explain that 1 whole trapezoid = 3/3, so each triangle is one-third of the trapezoid.
9. Return to the hexagon. Ask, "How many triangles will it take to cover the hexagon?" Look for the answer, "6." Explain that 1 whole = 6/6, so each triangle is one-sixth of the whole.
10. Next, have students complete the worksheet by drawing ways to make a whole and naming the equal parts of the whole (halves, thirds, fourths, sixths).

QUESTIONS TO CONSIDER:

- When you "partition" or "divide" a shape into equal parts, what do you notice about the pieces?   Are the pieces smaller or greater?

RESOURCES:

- [Mississippi Mathematics Scaffolding Document](#) (Grade 2, Page 27)
- [2016 MCCRS for Mathematics](#)
- [Toy Theater Pattern Blocks](#)- Virtual Manipulative

Optional: The University of Mississippi's Center for Mathematics and Science Education has an extensive inventory of math (and science and technology) tools and manipulatives that teachers may borrow for classroom use at no charge. Click the link below to access the inventory list and complete a check-out request.

- [CMSE Manipulatives](#)

BEYOND THE ACTIVITY:

- **Extension(s):** This activity can be used for introducing the concepts of equivalent fractions and adding fractions with like denominators. When students see that one trapezoid (½ of the hexagon) and 3 big triangles (3/6 of the hexagon) make the whole, they can easily see how they must trade their 1 trapezoid to get 3 more triangles, because, you can only add like shapes. Therefore, ½ + 3/6 = 3/6 + 3/6 = 6/6, which is 1 whole.
- **Misconception(s):** With pattern blocks, different shapes can be used to make the whole and students may count them as equal. *Example: 1 trapezoid and 3 triangles, and students say that is 4/4.* Students must understand that for equal or fractional parts, student must use only one

shape. *Example: six triangles or two trapezoids.* Also, lower performing students may struggle with identifying shapes by name, the teacher may begin by calling the blocks by color instead of using the name of the shape.

Activity Sheet
Parts of a Whole

Part 1 - Color and label each shape to match the ones used in class.

1. _____

2. _____
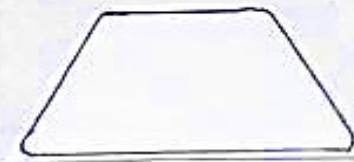
3. _____ 4. _____ 5. _____

Part 2 - Draw lines to show the following fractions. Then color them.

1. Draw and then color halves.
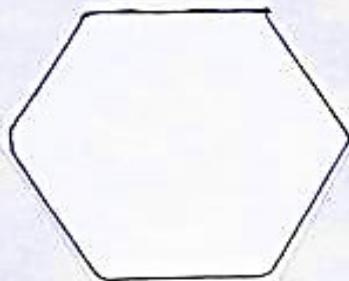
2. Draw and then color thirds.
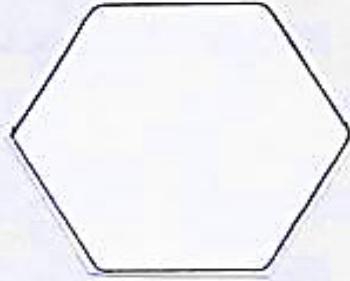
3. Draw and then color sixths.

4. Dray and color another way to make a hexagon, using different shapes/colors.