MISSISSIPPI DEPARTMENT OF EDUCATION
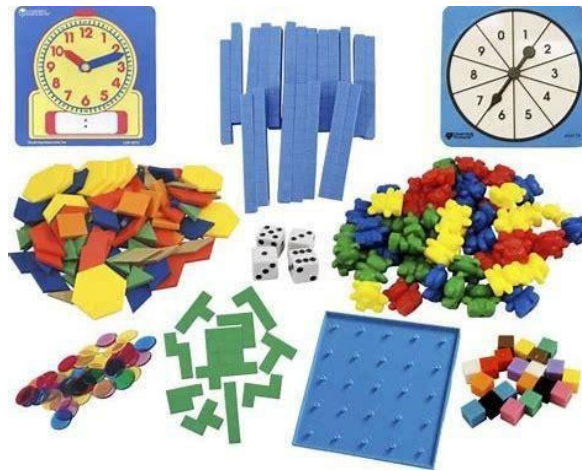
Ensuring a bright future for every child

Mississippi Mathematics Manipulatives Manual
Featured Activity

"Distance on the Plane"

5.G.2

Spring 2021

Carey M. Wright, Ed.D.
STATE SUPERINTENDENT OF EDUCATION

Nathan Oakley, Ph.D.
CHIEF ACADEMIC OFFICER

Marla Davis, Ph.D.
ACADEMIC LIAISON
Office of Academic Education

Wendy Clemons
EXECUTIVE DIRECTOR
Office of Secondary Education, Dropout Prevention, & Professional Development

Tammy Crosetti
STATE DIRECTOR OF CURRICULUM AND INSTRUCTION
Office of Secondary Education

Tommisha Johnson, Ed.S.
K-12 MATHEMATICS CONTENT DIRECTOR
Office of Secondary Education

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).
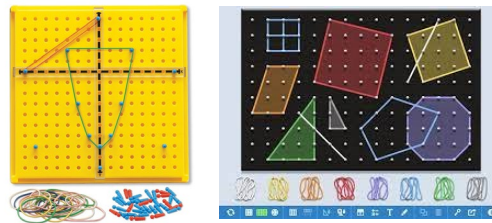
Distance on the Plane

MANIPULATIVE(S):
- Geoboard or Pegboard
- Colored Pegs for Pegboard
- Rubber bands

Alternative Manipulatives:
- Geoboard- The Math Learning Center

GRADE LEVEL OR COURSE TITLE:	DOMAIN AND CLUSTER HEADING:
CCR Mathematics Grade 5	Geometry (G): Graph points on the coordinate plane to solve real-world and mathematical problems

STANDARD(S):

5.G.2: Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

PREREQUISITE SKILLS:

- Know coordinate planes are created when two perpendicular lines cross and a mathematical grid is placed upon them.
- Know these perpendicular lines are labeled as the x-axis and the y-axis.
- Know points within a plane can be located using an ordered pair which consists of an x-coordinate and a y-coordinate.
- Know movement begins at the origin, follows the x-axis first, and the y-axis second.

ACTIVITY: Note: Activity Sheets Attached

1. Distribute a pegboard, pegs, and rubber bands, or, as an alternative, a geoboard and rubber bands to each student. ***Note:*** For a virtual alternative, see the Resources section below.)
1. Whole group, review with students the parts of a coordinate grid, the steps to plotting points, and counting the units between two points. ***Note:*** Teachers may also want to help student make the real-world connection of the coordinate grid and its relation to a map.
2. Allowing students to work individually or pairs, distribute an Activity Sheet to each student.
3. Have the students complete Part 1 of the Activity Sheet by plotting the given points and connecting them using the rubber bands, in the order directed.
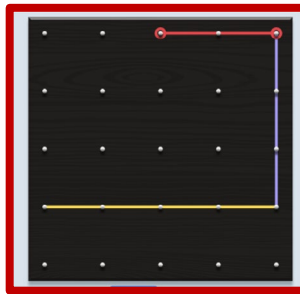

Figure 1: Sample of completed Part 1 of Activity Sheet 1.

4. Once students have completed Part 1, observe students' work to determine if any misconceptions warrant discussion.
5. Next, have student use their completed pegboard, from Part 1, to answer the questions related to distance to complete Part 2 of the Activity sheet.

QUESTIONS TO CONSIDER:

- How do you measure the distance between two points (pegs)?
- How do you count units on a grid?

RESOURCES:

- [Mississippi Mathematics Scaffolding Document](#) (Grade 5, Pages 60-61)
- [2016 MCCRS for Mathematics](#)
- [Geoboard](#)- The Math Learning Center

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)**: Students can create a picture of their own choice by placing and connecting pegs in a certain order.   However, students are required to document their process by writing down the coordinate pairs that they plot and the order in which they were plotted. Then have another student to draw the picture using their directions to re-create the picture.

- **Misconception(s):** Students may struggle with understanding the importance of order. Be certain to identify and clarify the difference between points like (3,4) and (4,3); and points like (0,5) and (5,0).

Activity Sheet

Date:　　　　　**Name:**

Part 1: Plot the following points on the pegboard.

Ryan's home is at (1,2).
Chocolate House is at (5,2).
The children's play area is at (5,5).
Dean Elementary School is at (3,5).

Part 2: Follow the given directions and answer the related questions.

1. Connect Ryan's house to Chocolate House using a rubber band. Each unit on the pegboard is equal to one mile (1mi).

   How far is the Chocolate house from Ryan's home?

   ....

2. Connect the Dean Elementary School with the children's play area using a rubber band. Each unit on the pegboard is equal to one mile (1mi).

How far is the children's play area from Dean Elementary School?

…………………………………………………………………………………

3. Connect the Chocolate house with the children's play area using a rubber band. Each unit on the pegboard is equal to one mile (1mi).

How far is the Chocolate house from the children's play area?

…………………………………………………………………………………

4. The longest distance is between which two locations?

…………………………………………………………………………………

5. The shortest distance is between which two locations?

…………………………………………………………………………………