MISSISSIPPI DEPARTMENT OF EDUCATION

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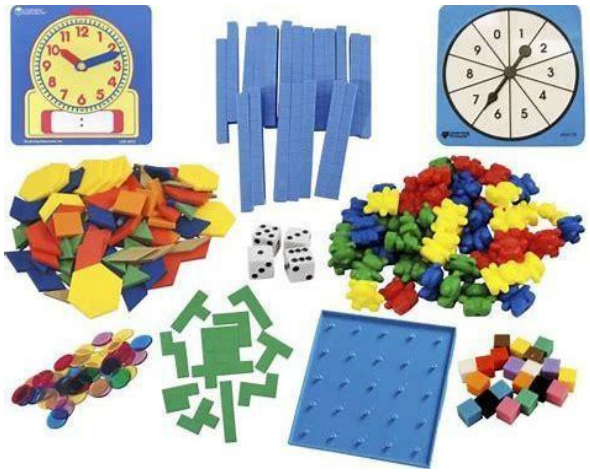
Mississippi Mathematics Manipulatives Manual

Featured Activity



"Rational/Irrational Card Sort"

8.NS.1

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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:
Karin Bowen,
Rankin County School District

Rational/Irrational Card Sort

MANIPULATIVE(S):

- Index Cards
- Masking Tape

GRADE LEVEL OR COURSE TITLE:

CCR Mathematics Grade 8

DOMAIN AND CLUSTER HEADING:

The Number System (NS):

Know that there are numbers that are not rational, and approximate them by rational numbers

STANDARD(S):

8.NS.1: Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

PREREQUISITE SKILLS:

- Know real numbers are the set of rational numbers together with the set of irrational numbers.
- Know a rational number is a number expressed in the form a/b or -a/b for some fraction a/b. The rational numbers include the integers.
- Know the decimal form of a fraction is called a repeating or terminating decimal.
- Know a repeating decimal is the decimal form of a rational number.
- Know repeating decimals can be represented using bar notation where a bar is drawn only over the digit(s) that repeat. *For example, 0.333333…. = 0. $3^{\overline{\ }}$*
- Know a decimal is called terminating if its repeating digit is 0. *For example, $0.250^{\overline{\ }}$ is typically written 0.25.*

ACTIVITY:

Note: Activity Sheet Attached

(The attached activity sheet can be used with the index cards for the whole group activity or given to students as an individual activity.)

1. Before class begins:
   a. Use the tape to make a large number line on the floor. (***Note:*** It is recommended to leave a minimum of one foot between each number, if space allows.)
   b. Then, label one corner of the room "Rational" and another corner "Irrational".
   c. Using index cards, write a rational or irrational number on enough cards for every student in the class to receive a card.
2. As students enter, pass out a card to every student.
3. Once all students have a card, ask students to group themselves based on whether the number on their card is rational or irrational.
4. After all students have grouped themselves as having a rational or irrational card, have students gauge whether each student is sorted accurately. Ask students to justify any changes they feel need to be made.
5. Next, have each student to order themselves in a line from least to greatest.
6. Once again, ask the students to evaluate the ordering and make changes as necessary. Remember to ask students to explain their reasoning on the number placement or any changes that they feel need to be made.
7. Now, ask students to place their number correctly on the number line. Have students work together to prove the numbers have been placed correctly.
8. Lastly, ask the students to evaluate the ordering and make changes as necessary. Again, ask students to explain the logic behind the number placement or any changes they feel need to be made.

QUESTIONS TO CONSIDER:

- How did you determine if your number was rational or irrational?
- How did you decide where your number belonged when ordering the numbers from least to greatest?
- How did you use rational numbers to help you place irrational numbers on the number line?

RESOURCES:

- Mississippi Mathematics Scaffolding Document (Grade 8, Page 1)
- 2016 MCCRS for Mathematics

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:

- **Accommodation(s)**: Provide calculators to students who may need assistance with determining the type of number they have and/or whether the number they hold is larger or smaller than the other cards in the group.
- **Assessment(s):** Use formative assessments with multiple select questions or sorting questions to assess understanding.

Activity Sheet

$3.\overline{14}$	$-\sqrt{49}$	6
2^2	$-\sqrt[3]{125}$	$\frac{18}{6}$
$-\frac{4}{5}$	$-\frac{\sqrt{64}}{8}$	3^2
5.2	$5.\overline{2}$	$\frac{5.3}{6.5}$
1^3	π	$\sqrt{2}$
$-\sqrt{17}$	$3\sqrt{5}$	$\sqrt[3]{9}$
2.5π	$\sqrt{26}$	$-\sqrt[3]{60}$
$\frac{\pi}{4}$	$\frac{\sqrt{5}}{2}$	$\sqrt{11}$