



Mississippi Mathematics Manipulatives Manual Featured Activity



“Adding Algebraic Expressions - An Introduction”

7.EE.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.

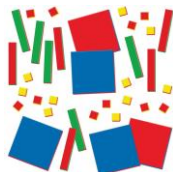
Teachers may modify these activities to meet the needs of the students they serve and their instructional delivery model (virtual, in-person, or hybrid).

Special Thanks:
Jennifer Gaston, Ed.S.,
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Adding Algebraic Expressions - An Introduction

MANIPULATIVE(S):

- Algebra Tiles



GRADE LEVEL OR COURSE

TITLE:

CCR Mathematics Grade 7

DOMAIN AND CLUSTER HEADING:

Expressions and Equations (EE):

Use properties of operations to generate equivalent expressions

STANDARD(S):

7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

PREREQUISITE SKILLS:

- Know that a variable is a symbol, usually a letter, used to represent a number in mathematical expressions.
- Understand that an algebraic expression is a combination of variables, numbers, and at least one operation.
- Know and understand the associative property of addition which states: $(a + b) + c = a + (b + c)$.
- Know and understand the commutative property of addition which states: $a + b = b + a$.
- Know and understand the distributive property of multiplication over addition which states: $a \times (b + c) = a \times b + a \times c$.
- Know that a linear expression is a collection of variable terms and constant terms that are joined by addition or subtraction, and the variables are raised to the first power.
- Know that a rational coefficient is the number that is multiplied times a variable.
- Understand that to combine like terms means to add the terms that have the exact same variable raised to the exact same power.

ACTIVITY:

Note: Activity Sheet Attached

1. Combine students in pairs or groups of no more than four.
2. Ensure each pair or group has access to a set of Algebra Tiles. **Note:** A virtual option can be found at <https://didax.com/apps/algebra-tiles/>. (See *Resources section below for a tutorial on using this tool.*)
3. Review the value of each Algebra Tile with students, ensuring that everyone is clear on what each tile represents (ex. *blue square = x^2 , red square = $-x^2$, etc.*).
4. Review that opposites will cancel each other out by resulting in a sum of zero or making a zero pair (ex. *1 blue square (x^2) and 1 red square ($-x^2$) results in a zero; 2 red squares ($-2x^2$) and 1 blue square (x^2) yield a total result of $-1x^2$).*
5. Provide students with an addition problem with like terms and model the two expressions with Algebra Tiles. After the expressions are modeled, ask students to combine like tiles together and write the total number of tiles they have left after removing zero pairs. *For example, the expression $(3x+2) + (-2x-1)$ would be represented by three green variable tiles and 2 yellow unit tiles with 2 red variable tiles and 1 red unit tile.*
6. Guiding students, review with them how to determine how many tiles will be removed due to the creation of zero pairs.
7. Write the solution which is represented by the number of tiles remaining after all zeros have been removed.
8. Repeat steps #5-7 using different expressions.
9. Once students have a grasp on this concept, allow them to create and solve their own problems.

QUESTIONS TO CONSIDER:

- What are like terms?
- How is adding expressions like adding and subtracting integers?

RESOURCES:

- [Mississippi Mathematics Scaffolding Document](#) (Grade 7, Page 16)
- [2016 MCCRS for Mathematics](#)
- [Virtual Algebra Tiles](#)- Didax
- [Virtual Algebra Tiles Tutorial](#)-Didax Education Video
- [Algebra Tiles Activity](#)- NCTM Illuminations
- [Algebra Tiles Tutorial](#)- NCTM Illuminations

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:** Provide students with a solution and ask them to simplify it by factoring or grouping.

Activity Sheet

Algebra Tiles Manipulation Handout

Name: _____

Class: _____

Date: _____

Original Expression:

Model:



Simplified Expression: _____

Original Expression:

Model:



Simplified Expression: _____

Original Expression:

Model:



Simplified Expression: _____