California State University Chico

School of Education

SSP LESSON PLAN TEMPLATE

WHO	Who is Learning?

TEACHER: Kamille Delgardo (CT Emily Abshier) **DATE:** 16 October 2025

INQUIRY-BASED LESSON TITLE:

How can rectangles help me multiply? Exploring an Area Model

CONTENT AREA: Integrated Math I

GRADE LEVEL(S): 9-12

NUMBER OF ELD STUDENTS AND LEVELS:

Numerous reclassified native Spanish speakers.
One English Learner in a Structured English Immersion Program
Levels (As of 2022):

- **Oral**: 3 out of 4
- **Written**: 2 out of 4
- **Listening**: somewhat/moderately
- **Speaking**: well developed

NUMBER OF IEP and/or 504 STUDENTS:

504 - 4
IEP - 4

STUDENTS' ASSETS:

Our student athletes will be able to manage and work in teams well, making sure that everyone has a role and everyone gets a turn. Students involved in visual arts should see how parts can add up to a whole. They will also use spatial reasoning to relate algebra tile rectangles to area models.

STUDENTS' LEARNING NEEDS:

It may have been awhile since students used algebra tiles to depict expressions and equations. We will need to remind them of positive/negative tiles and that x and y are variable lengths.

LESSON LENGTH: 50 minutes

WHAT	What are students learning?

CONTENT STANDARD(S) & MATHEMATICAL PRACTICE STANDARD(S):
CA Math Content Standards

Mathematical Practice Standards

Content Standard: **Mathematics I Seeing Structure in Expressions A-SSE "Interpret the structure of expressions"**

- **1.** Interpret expressions that represent a quantity in terms of its context.
    - **a.** Interpret parts of an expression, such as terms, factors, and coefficients.

Practice: Make sense of problems and persevere in solving them, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, and look for and make use of structure.

CONTENT-SPECIFIC LEARNING GOAL(S):

Goals:

- Students will be able to identify dimensions, and compute the areas and perimeters, of shapes formed with algebra tiles.
- Students will be able to build and compute an area model given polynomial expressions as dimensions..
- Students will be able to show equality between LxW and the sum of terms in an area model.

Success Criteria:

- For two binomial expressions of degree-1:
    - Students will be able to build and fill out an area model for finding their product..
    - Students will be able to show equality between the product of the binomials and the simplified degree-2 sum of the terms in the area model.

ENGLISH LANGUAGE DEVELOPMENT STANDARD(S):
CA ELD Standards

Grades 9-10 Part I: "Interacting in Meaningful Ways"

- A. Collaborative 1. Exchanging information and ideas with others through oral collaborative discussions on a range of social and academic topics

ENGLISH LANGUAGE DEVELOPMENT GOAL(S) FOR ELD STUDENTS:

Students will be able to describe an area model in terms of LxW as the **product** of two sides or the **sum** of all parts as they are Spanish cognates.
Sumar is Spanish for "to add" and **producto** is Spanish for "product."

IEP GOAL(S) FOR IEP STUDENTS (if applicable):

- Our ADHD student will self-regulate by taking short breaks outside, as needed. We have moved his seat to be next to the door for easier access.
- Students will raise hands to ask appropriate questions or answer questions posed to the class.

ACADEMIC/CONTENT LANGUAGE DEMANDS AND PLANNED SUPPORTS:

Language Function:

- Students will be able to **compare** area models, algebra tile rectangles, and polynomial multiplication representations.
- Students will be able to **explain** how the product of length and width is equivalent to the sum

of a model's parts.

Vocabulary:

- Product, sum, area, polynomial, expression, equivalent

Discourse:

- Interpreting graphic representations (area models, algebra tile rectangles)

Syntax:

- Mathematical sentences using words and symbols, for example:
  - (2x + 3)(4x + 5) = 8x^2 + 22x + 15
- Operations such as "combine like terms"

Planned Supports:

- Examine (diagram, rectangle) - Remind students of properties of an algebra rectangle - its parts and its dimensions.
- Combine like terms - Break down parts of a polynomial and see if any can be simplified, added, or subtracted

WHY — Why does this lesson matter? (Rationale)

RELEVANCE:

Distinguishing between the area and the perimeter of an algebra tile shape is essential foundational knowledge for using area models in future maths to multiply polynomials and work with quadratics.

PRIOR KNOWLEDGE:

Students have experience working with variables in both equations and expressions. They have used algebra tiles to model equations and expressions in prior courses. Students know the difference between area and perimeter.

HOW — How is Learning Being Facilitated?

CREATE HEALTHY CLASSROOM COMMUNITY:

I will encourage participation from all students by drawing names from my playing card deck at random.
I will try to select students to share their work as I circulate and see how they're doing.
(Hopefully this won't need to happen but one student in this class is on his last warning for physically and psychologically bullying his twin brother and I've said next time is straight to Principal Wilkes.)

ACADEMIC LITERACY (Listening, Reading, Writing, Speaking):

Students will listen to teachers as they present and to each other in groups. They will read the assignment steps from the textbook opened on the smartboard. They will write their findings as they discover them and speak their findings to the class.

ACCOMMODATIONS, MODIFICATIONS & UDL CONSIDERATIONS:

- A Spanish version of the textbook is available in print and on Chromebook.
- Mrs. Riley will be pushed in from the resource classroom to assist.

CO-TEACHING Strategy(s) AND/OR PARAPROFESSIONAL SUPPORT (If applicable)**:**

I will each take the lead on each question. CT Mrs. Abshier, Education Specialist Mrs. Riley, and I will circulate through groups individually after each main lesson.

INFORMAL ASSESSMENT(S):

As we circulate, ask questions of students:

- What is the length and width of this rectangle?
    - How is that related to the area?
    - How can you write an equation comparing LxW and the sum of the tiles?
        - What does that tell you about their relationship?
- Is there more than one way to arrange these tiles?
- How many terms are in this polynomial?
- What are the dimensions of the X^2, Y^2 and XY algebra tiles? How can you tell?
- Can you simplify this further (combine like terms)? Why or why not (for multivariable questions)?
- (For early finishers) What would be the perimeter of this area model as a rectangle?
- I will do thumbs up/side/down for knowledge checks and make sure I get a response from everyone.

FORMAL ASSESSMENT(S):

Call volunteers to come up and share their findings using the Smartboard.
Each area model member should include:

- Completed squares
- Simplified expression
- Equality showing LxW = simplified expression

MATERIALS NEEDED: (List equipment and materials necessary for the lesson.)

- Algebra tiles OR Chromebook to use CPM Tiles e-Tool
- Notebook and pencil to draw tile representations
- Resource page for problems 3-83 to 3-85
- Smartboard for students to share area model findings for class

LEARNING ACTIVITY SEQUENCE: (Procedure)

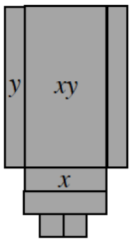
0: We will start by checking the homework from lesson 3.2.1, then we will answer any questions students bring up (**UDL 5.3 Promote individual and collective reflection**). Ask students to get out Chromebooks to use the textbook and algebra tiles e-Tool.

1. **Engaging Introduction**:

(Metacognition) Throw a complicated polynomial multiplication problem on the board. Ask students if they can solve it without using algebra tiles. Ensure them that by the end of the lesson they will have the tools and models to solve it.

2. **Learning Activities**:

3-83. Use algebra tiles or *3-83 Student eTool* CPM to build the polygon at right. Sketch the algebra tile figure on your paper. Write a simplified expression for the area and for the perimeter.



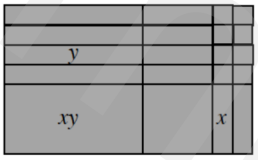
Students will use a resource page for the first 3 problems.

Check for understanding about the definitions for area (total space inside) and perimeter (total length of sides). This was covered in yesterday's lesson.

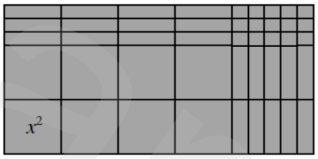
Have students work on this for a few minutes then solicit individual answers for each component of the perimeter. Expect to have to explain the dimension (x-2) and combine like terms.

3-84. You have seen that the area of a rectangle can be written two different ways: as a *product* of its width and length, and as a *sum* of the areas of its parts.

Write the area of the following rectangle as the product of its dimensions equivalent to the area as the sum of its parts. Remember to combine like terms when possible.



3-85. Write the area of the following rectangle as the product of the dimensions equivalent to the area as a sum of the parts. Remember to combine like terms when possible.



This should be review from yesterday. Give students a few minutes to find area as a sum and area as a product for 84-85. Solicit answers for each.

Make sure students write an equation showing the relationship between the two. Students should be doing this in the LxW = area sentence frame on their resource page.

3-86. Now examine the following diagram. How is it similar to the algebra tile rectangle in problem 3-85? How is it different? Talk with your teammates and write down all of your observations.

$+3$	$12x$	15
$2x$	$8x^2$	$10x$
	$4x$	$+5$

Do this as a whole class. Make sure all students state and restate where each term is coming from to

drill in the fact that $3 * 4x = 12$, etc.
Write out the polynomial and ask if there are like terms we can combine.
Color-code each part of the area model and correlate it with a part of the algebra tile rectangle from 3-85.
Encourage students to copy this area model next to the algebra tiles for 3-85 on their resource page. (Remind students they are called *resource pages* for a reason – they can be used for our open note tests.)

3-88. Diagrams like the one in problem 3-87 are referred to as **area models**. Area models represent multiplication of algebraic expressions.

For each multiplication expression, sketch an area model. Label the dimensions and the area of each part. Then write an equation showing that the area as a product equals the area as a sum.

a. $(x+1)(x+2)$ b. $3(2x+5)$ c. $(2x-3)(x+2)$

d. $(x-1)(y-1)$ e. $-2y(y+3)$ f. $(-x+1)(3x+y-4)$

Based on prior courses, Mrs. Abshier says we may not get to this problem.

3. **Learning Closure:**

Revisit the complicated polynomial multiplication problem from the introduction. Ask students if they now have the tools to solve it.
Collaboratively build an area model with which they can solve it. Emphasize that decomposing problems like this turns them into just a process of multiplying and adding two terms at a time.

REFLECTION

ASSESSMENT RESULTS:

LESSON OBSERVATION FOCUS:

Effectiveness of informal and formal assessments.