

Bachelor of Education (Elementary) & Bachelor of Education (Secondary) STEM Lesson Plan

4.3 - Multiplying Polynomial

Lesson Title: _____ Expressions Lesson # _____ 1 Date: _____ 20/4/2026
Name: _____ Zihan Pan Subject: _____ Math Grade(s): _____ 9

Rationale:

In this session, students will learn the concept of multiplication of two polynomial expressions with each other. They will use different multiplication methods - using tile models, and using written expressions - to understand how to multiply polynomials of like and unlike terms. Using this, students can apply their understanding to real-world examples.

Core Competencies:

Communication	Thinking	Personal & Social
Students engage in informal and structured conversations in which they listen, contribute, develop understanding and relationships, and learn to consider diverse perspectives.	Students think critically to develop ideas. Their ideas may lead to the designing of products or methods or the development of performances and representations in response to problems, events, issues, and needs.	Students build and maintain diverse, positive peer and intergenerational relationships. They are aware and respectful of others' needs and feelings and share their own in appropriate ways. They adjust their words and actions to care for their relationships.

Big Ideas (Understand)

Two polynomials can be multiplied with each other using different methods - creating a model with algebraic tiles, and using algebraic expressions to multiply terms.

Learning Standards

(DO)	(KNOW)
Learning Standards - Curricular Competencies	Learning Standards - Content
Reasoning and Understanding - Use reasoning and logic to explore, analyze, and apply mathematical ideas - Demonstrate and apply mental math strategies Understanding and Solving - Apply multiple strategies to solve problems in both abstract and contextualized situations	• operations with rational numbers (addition, subtraction, multiplication, division, and order of operations) • exponents and exponent laws with whole-number exponents • operations with polynomials, of degree less than or equal to 2 • multi-step one-variable linear equations • spatial proportional reasoning

- Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving - Visualize to explore mathematical concepts Communicating and representing - Use mathematical vocabulary and language to contribute to mathematical discussions - Explain and justify mathematical ideas and decisions Connecting and reflecting - Reflect on mathematical thinking - Connect mathematical concepts to each other and to other areas and personal interests	
---	--

Instructional Objectives & Assessment

Instructional Objectives (students will be able to...)	Assessment
• Multiply two polynomial expressions • Use algebraic tile models • Solve algebraic expressions	• Formative: Examination of group work and observation • Summative: Student performance in practice questions

Prerequisite Concepts and Skills:

Basic operation (addition and multiplication) Area of rectangle Spatial awareness Algebraic expressions and their degree, variables, and constants

Indigenous Connections/ First Peoples Principles of Learning:

Indigenous communities are focused on welcoming the whole community in their learning process. Allowed to express their culture without judgement, are respected for their decisions, and are valued by fostering positive relationships. The activities planned during this class aim to emulate these practices, as students are given the chance to help each other and encourage students to work collaboratively, promoting respect for diverse perspectives and ideas. Just as Indigenous learning emphasizes the importance of community and shared responsibility, students in this lesson may work together to help each other understand multiplication in polynomials.

Universal Design for Learning (UDL):

Individual Work Group Work Class Discussion PowerPoint Presentation Whiteboard Writing
--

Differentiate Instruction (DI):

Students with DI will be accommodated by providing additional resources.
--

Materials and Resources

- Whiteboard
- Presentation Board
- Markers
- Worksheets - Practice and Note-Taking

Lesson Activities:

Teacher Activities	Student Activities	Time
Introduction: Give Playing Cards to students (poker) for forming groups Allow students to settle down, using bell for getting attention A Self-Introduction Presentation (with photos) Discuss Secret Box	Put phones in drawer before class begins Find groups and sit together	8:29 am - 8:40 am
Body: Quick Review - What is a monomial? Exponents, and Exponent Laws Area of Rectangle Multiplication of Monomials - - Area Method using Algebraic Tiles (VISUAL UNDERSTANDING) Describe how multiplication can be done using algebraic tiles (area) - drawing EX: $(3x)(2x)$ Draw a $3x$ length and $2x$ wide rectangle, showing that the product is a 6-unit x^2 tile rectangle. Then, with the concept of an area of a rectangle, show that the answer of a multiplication between $3x$ and $2x$ is $6x^2$. Emphasize that this is a slower way, used for understanding and not for actual calculation. - Algebraic Expression Method	Students add to the discussion of the review, and take notes where needed. Students take notes and participate in learning about multiplication Students draw the visual representation of this multiplication exercise, to understand the process	8:40 am - 8:48 am 8:48 am - 8:58 am

For multiplication of terms, show the process of grouping coefficients and the different ways to depict multiplication [. , () , x] and why x is not used for multiplication of variable terms (confusion with the variable x). EX: $(3x)(2x) = 3 \cdot 2 \cdot x \cdot x = 6x^2$ Show use of exponent rule to reinforce understanding - $x^1 \cdot x^1 = x^{1+1} = x^2$ Show multiplication with a negative term Q1: $(2x)(-2x) = 2 \cdot -2 \cdot x \cdot x = -4x^2$ Show multiplication of two different variables Q2: $(3x)(2y) = 3 \cdot 2 \cdot x \cdot y = 6xy$ Board Activity Students will find an area of board, and take markers for writing on boards. Students are given practice questions, EX: $(4x)(2x)$, $(-2x)(2x)$, $(5x)(4y)$ Walk around the classroom and observe student performance, helping any students that may have questions along the way. Students return to their assigned seats after all expressions are solved (3 Questions) Textbook questions: Students are provided textbook questions for individual study	Students take notes on the algebraic method of multiplication of monomials. Students get into groups together. They work together to solve the given expressions. Students ask questions about the activity if needed. Students begin practice Qs	8:58 am - 9:08 am 9:08 am - 9:20 am 9:20 am - 9:40 am
Closure: - Give students information on Action Research Project, and distribute Consent Forms - Collection of complete consent forms on following day If Extra Time: - Balloon Activity - Passing a balloon around to ask questions	Students collect TARP Consent and Informational Forms	9:40 am - 9:46 am

Organizational Strategies:

Group exercises
Poker Playing Cards for forming groups
Whiteboard Activities

Proactive, Positive Classroom Learning Environment Strategies:

Working together
Choice to share ideas
Randomized groups

Extensions:

Additional Practice Questions
Balloon Discussion

Reflections (if necessary, continue on separate sheet):