



The Key Elements to Algebra Success Description of Teacher's Guide

Essential Questions are provided at the beginning of each lesson to provide the framework for the lesson and guide the learning process. The essential questions are used not only at the beginning of the lesson, but are also an important part of the lesson closure. Each essential question ties into a SOLVE problem which is used as an introduction and closure tool in each lesson.

Each lesson concept is bracketed with the SOLVE problem solving method. Along with the essential question, the "S" step of SOLVE is introduced at the beginning of the lesson. This helps to guide the learning of the student as they progress through the lesson. At the end of the lesson, the SOLVE problem introduced at the beginning of the lesson is revisited. The student completes the additional steps of SOLVE, applying the lesson concept in a problem solving situation.

Algebra Success

T695

LESSON 30: Multiplying Monomials and Polynomials

[OBJECTIVE]

The student will learn how to multiply monomials and polynomials.

[MATERIALS]

Student pages **S1-S12**
Transparencies **T702, T703, T705, T707, T709, T711, T713**
Red and yellow algebra tiles

[ESSENTIAL QUESTIONS]

1. Does the distributive property change when variables are involved?
2. Do you follow the same rules for multiplying monomials when distributing a monomial to a polynomial?

[GROUPING]

Cooperative Pairs, Whole Group, Individual

[LEVELS OF TEACHER SUPPORT]

Modeling (M), Guided Practice (GP), Independent Practice (IP),
Cooperative Pairs (CP)

[MULTIPLE REPRESENTATIONS]

SOLVE, Verbal Description, Concrete Representation, Pictorial Representation

[WARM-UP] (5 minutes - IP) S1 (Answers on T701.)

- Have students turn to S1 in their books to begin the Warm-Up. Students will review multiplying monomials. Give students 3 minutes to complete the problems and then spend 2 minutes reviewing the answers as a class. (Algebraic Formula)

[HOMEWORK]: (5 minutes)

Take time to go over the homework from the previous night.

[LESSON]: (47-55 minutes - M, GP, IP)

T696

Algebra Success

LESSON 30: Multiplying Monomials and Polynomials

SOLVE Problem

(2 minutes - GP) T703, S3 (Answers on T704.)

Have students turn to S3 in their books, and place T703 on the overhead. The first problem is a SOLVE problem. You are only going to complete the S step with students at this point. Tell students that during the lesson they will learn how to multiply polynomials. They will use this knowledge to complete this SOLVE problem at the end of the lesson. {SOLVE}

Monomial \times Binomial

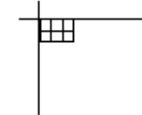
(7 minutes - M) T702, T704, S2, S3 (Answers on T704.)

Have students turn to S2 in their books, and place T702 on the overhead. Pass out the algebra tiles to each student. Students used the algebra tiles to add and subtract polynomials in Lesson 29. Remind students that the algebra tiles still represent the same values and variables. Use the following activity to model for students how to multiply monomials by binomials at the concrete level using the overhead algebra tiles. Students will model the problems at their desks using their red and yellow algebra tiles. Students can work independently or in pairs. {Algebraic Formula, Verbal Description, Concrete Representation, Pictorial Representation}

MODELING

Multiply a Monomial by a Binomial

Step 1: Review with students how to use arrays to represent multiplication. Model with students how to use the small squares from the algebra tiles to make a concrete representation of $2 \cdot 3$ (2 groups with 3 items in each group) on T702, as shown below. The area created by the small squares is $2 \cdot 3 = 6$.



Explain to students that they will use the same method to multiply polynomials. They will represent the first factor vertically and the second factor horizontally. The area created by the factors will represent the answer.

Each lesson contains "modeling boxes" which contain step by step instructions on how to model each concept. Modeling steps are provided for concrete, pictorial and procedural steps of the lesson.

Each lesson begins with a warm up activity which connects previously learned skills and concepts to the current topic. The warm-up sets the stage for new concepts being introduced in each lesson.

Lessons have been designed for a 50-70 minute class. Suggested times are provided as a guideline for each section of the lesson, indicating the instructional time needed for each section of the lesson.

Multiple representations of the concept are incorporated in each lesson. These representations include concrete, pictorial, procedural, verbal descriptions, graphs, tables, formulas and a problem solving paradigm. The multiple representations provide students with different learning styles and abilities the opportunity to acquire and apply knowledge of the lesson concept.