Grade Six Chapter 7 - Algebra: Expressions
Overview & Support

Standards:

Apply and extend previous understandings of arithmetic to algebraic expressions.

6.EE.1   Write and evaluate numerical expressions involving whole-number exponents.

6.EE.2   Write, read, and evaluate expressions in which letters stand for numbers.
   a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.*
   b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.*
   c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.*

6.EE3   Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*

6.EE4   Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*

Reason about and solve one-variable equations and inequalities.

6.EE.6   Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

Suggested Routines:
- Number Talks using expressions
- building expressions with algebra tiles or base base 10 blocks, label parts
- translating word problems to expressions

Suggested Resources:
- https://tasks.illustrativemathematics.org/6.EE

(Visual Activities)
- Read *Fabulous Fibonacci Numbers* from Grab and Go Differentiated Centers Kit (Fibonacci's mathematical discoveries relating to patterns)
- https://www.cde.ca.gov/Ci/ma/cf/documents/mathfwgrade6lmg2.pdf

Manipulatives:

algebra tiles   base 10 blocks   counters and cubes

Vocabulary:

exponents	base (repeating factor)	factor
terms	numerical expression	order of operations
evaluate	algebraic expression	variable
coefficient	like terms	equivalent expressions
commutative property	associative property	identity property
distributive property	constant (framework p.32)	

Strategies for Chapter:
- write exponents in expanded and exponential form to solve
- use bar models/tape diagrams to solve expressions
- review vocabulary throughout chapter

Color Coding:
Green (G)- The lesson accurately reflects the Framework standard(s).
Yellow (Y) - This lesson includes notes to refer to while planning the lesson.
Red (R) - This lesson does not accurately reflect the Framework standard(s). Skip the lesson.

Essential Question:
How do you write, interpret, and use algebraic expressions?

Lesson-by-Lesson Overview:

Lesson #, Standard	Title	Materials	Vocab	Notes
Show What You Know G	Show What You Know			
7.1 Y 6.EE.1	Exponents	Whiteboards	exponent, base, factor	Focus on the meaning of the exponent and have students write it in exponential form, expanded form (multiplication expression), and the evaluated form (the product) Focus on the meaning of the exponents will help students learn to expand them based on their meaning before solving.

				Any non-zero number raised to 0 power is 1 (Found in Framework under Common Misconceptions) Begin the lesson with the "Connect to Science" section on p. 264 to give context to their work with powers. Students worked with powers of 10 in 5th grade.
7.2 **Y** 6.EE.1	Evaluate Expressions Involving Exponents		numerical expression, order of operations, evaluate	Students worked with parentheses and brackets in 5th grade, but this is their first time learning the order of operations. *Beware of using "Please Excuse My Dear Aunt Sally" or other memorization techniques like PEMDAS due to confusing of order. Focus on keeping grouping of terms together. Students will need varied opportunities to practice using the order of operations. You may want to use Enrich 7.2.
7.3 **G** 6.EE.2a	Write Algebraic Expressions	Whiteboards, *Enrich 7.3 as a card sort, 1 per group	algebraic expression, variable	Use enrich 7.3, *Which Expression am I?*, as a sorting activity. 1 copy per group cut up and placed in an envelope in needed. This could be used to summarize the Lesson 7.3
7.4 **Y** 6.EE.2b	Identify Parts of Expressions	whiteboards	terms, coefficient, variable constant	Students need to have an understanding of terms as the basis for order of operations. Framework: "*Students identify the parts of an algebraic expression using mathematical vocabulary such as variable, Coefficient, constant, term, factor, sum, difference, product, and quotient (6.EE.2b). They should understand terms are the parts of a sum, and when a term is an explicit number, it is called a constant. When the term is a product of a number and a variable, the number is called the coefficient of the variable. Variables are letters that represent numbers. Development of this common mathematical vocabulary helps students understand the structure of expressions and explain their process for evaluating expressions.*"
7.5 **G**	Evaluate Algebraic Expressions		Evaluate, substitute, variable	Teach the difference between numerical and algebraic expressions. Prior to 6th grade, students focused on numerical

6.EE.2c	and Formulas			expressions only. Page 277B Vocabulary Builder can help students visualize the difference.

Mid-Chapter Checkpoint

7.6 Y 6.EE.6	Use Algebraic Expressions		algebraic expressions formula, equation	Note the difference between an expression and an equation. **Students need to be using manipulatives when working with equations.** *Framework: "Students can use manipulatives and pictures (e.g., tape-like diagrams) to represent equations and their solution strategies. When writing equations, students learn to be **precise in their definition of a variable**—for example, writing "n equals John's age in years" as opposed to writing only that "n is John"*
7.7 G 6.EE.3	Combine Like Terms		like terms combine like terms	Use Bar Models (Tape Diagrams) to solve word problems involving variables
7.8 Y 6.EE.3	Generate Equivalent Expressions		equivalent expressions, commutative property, associative property, distributive property, identity property	This is a complex lesson and may require more than one day of instruction. Properties are introduced formally in this lesson. However, students have worked with these properties in prior grade levels. Emphasize the distributive property factoring in; also address factoring out. See the Framework for more examples and explanation.
7.9 G 6.EE.4	Identify Equivalent Expressions		equivalent expressions	Highlight the importance of understanding the distributive property, which is the basis for combining like terms in an expression or equation.

Ch.7 Test

Chap. 7 Performance Task	See Go Math for the PT. This will give students the opportunity to experience a PT.

Reteach Options (1 day)	Reteach standards from this unit to help meet students' need. Some ideas for reteach activities are listed below: ● Math centers or math games focused on unit standards ● Small group instruction focused on a single standard ● Whole group instruction focused on a single standard ● My Favorite No – Rewrite student work with an error and work as a class to identify positives in the work and areas that need to be revised ● Select 1 – 3 problems to resolve in their groups and discuss whole class. We want new learning to occur on this day that helps students over misconceptions. ● Complete the "Performance Task" from Go Math! In the Assessment Book in small groups. Share strategies and discuss whole class. ● Use the Reteach activities based on standards that need intervention.