Plan for Grade 6 Unit 6: Expressions and Equations

Relevant Unit(s) to review: Grade 5, Unit 9: Application and Fluency with Whole Numbers

Essential prior concepts to engage with this unit	In this unit, students apply and extend previous understandings of arithmetic to algebraic expressions. Key understandings in play in this unit are as follows: ● Relationship between operations (addition and subtraction, multiplication and division) ● Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
Brief narrative of approach	Students may be in several stages of proficiency in the key understandings described. Some of these understandings started to build as early as grade 1. Multiple opportunities are built in throughout the unit to support the further development of these abilities, including the use of optional lessons. Consider making reference to the relationship between operations as applicable, as well as using tape diagrams and other representations to support desired connections to expressions and equations.

Lessons to Add	Lessons to Remove or Modify
None	Considerations to amplify targeted connections are embedded in the Modified Plan below. This is a list of optional lessons and activities to support decision making. 1. Lesson 11: optional lesson where students practice identifying and writing equivalent expressions using the distributive property.

	2. Lesson 18: optional lesson that offers opportunities to look at multiple representations (equations, graphs, and tables) for some different contexts. 3. Lesson 19: culminating lesson where students look at several examples of equations that represent important relationships from real-world situations.
Lessons added: 0	Lessons removed: 0

Modified Plan for Grade 6 Unit 6

Day	IM lesson	Notes
	assessment	6.6 Check Your Readiness assessment Note that the Check Your Readiness assessment includes item-by-item guidance to inform just-in-time adjustments to instruction within the lessons in 6.6.
1	6.6.1	Contrast diagrams for equations of the forms $x + p = q$ and $px = q$ in a straightforward manner. If students struggle with Items 5 and 6 on Check Your Readiness assessment, plan to provide additional support with the use of tape diagrams. Invite students to draw tape diagrams, even when not asked for.
2	6.6.2	This lesson is where "next to" notation is introduced (for example, $10m$ means $10 \cdot m$).
3	6.6.3	Students are reasoning about things one could “do” to hangers while keeping them balanced alongside an equation that represents a hanger, so they are thinking about “doing” things to each side of an equation, rather than simply thinking “What value would make this equation true?” If students do well with Item 3 on Check Your Readiness assessment, plan to engage students with Are You Ready for More prompt in this lesson.
4	6.6.4	Students consolidate their equation writing and solving skills.
5	6.6.5	Review solving different types of equations and introduces a/b notation for dividing numbers

		where *a* and *b* are not whole numbers.
6	6.6.6	Focus on writing expressions to represent situations begins.
7	6.6.7	Bring different standards together. Apply equations to problems about finding the amount that corresponds to 100%.
8	6.6.8	Students are introduced to the idea of equivalent expressions.
9	6.6.9	Introduction of the distributive property. Students generate equivalent numerical expressions that are related by the distributive property. If students struggle with Item 4 on the Check Your Readiness (CYR) assessment, consider replacing Activity 9.1 with by revisiting this prompt from CYR.
10	6.6.10	Students extend the work with the distributive property in the previous lesson to situations where one of the quantities is represented by a variable.
11	6.6.11	Additional practice with writing equivalent expressions using the distributive property.
12	Assessment	6.6 Mid-Unit assessment
13	6.6.12	Students then make use of the new shorthand notation to write expressions with exponents that evaluate to a given number. If students struggle with item 1 on the CYR assessment, consider revisiting ideas in this item from Lessons 12 through 14.
14	6.6.13	Students analyze the structure of expressions (MP7) to apply their understanding of exponents.
15	6.6.14	Students practice evaluating numeric expressions that include exponents.
16	6.6.15	Students encounter expressions and equations with variables that also involve exponents.
17	6.6.16	Students learn that relationships between two quantities can be described by two different but related equations with one quantity, the *dependent variable*, affected by changes in the other quantity, the *independent variable*. If students struggle with item 2 on CYR assessment, consider doing the last part of 16.2 together.
18	6.6.17	The second lesson on representing relationships between two quantities.

19	6.6.18	This final lesson on relationships between two quantities examines situations of constant area, constant volume, and a doubling relationship.
20	6.6.19	Students look at several examples of equations that represent important relationships in real-world situations.

Priority and Category List for Lessons

High priority (+), Medium priority (0), Low priority (-)

E: Explore, Play, and Discuss, D: Deep Dive, A: Synthesize and Apply

Lesson	Priority (+, 0, -)	Category (E, D, A)	Notes
6.6.1	+	E	The purpose of this lesson is to help students remember from earlier grades how tape diagrams can be used to represent operations. Students should engage with the activities and reason about unknown quantities in ways that make sense to them.
6.6.2	+	D	Students expand previously-held understandings of equations by thinking about the assumption that equations are always true. Students learn that a letter standing in for a number is called a variable. Students learn that, for an equation with a variable, a value of the variable that makes the equation true is called a solution of the equation.
6.6.3	0	D	The goal of this lesson is for students to understand that we can generally approach $p + x = q$ by subtracting the same thing from each side and that we can generally approach $px = q$ by dividing each side by the same thing.
6.6.4	+	A	Students may choose any strategy to solve equations, including drawing diagrams to reason about unknown quantities, looking at the structure of the equation, or doing the same thing to each side of the equation. They choose efficient tools and strategies for specific problems.
6.6.5	+	A	In this lesson, students apply the general procedure they just learned for solving $px = q$ in order to define what $\frac{a}{b}$ means when a and b are not whole numbers.

6.6.6	+	E	Students write expressions that record operations with numbers and with letters standing in for numbers. Students can choose to represent expressions with tape diagrams if they wish (MP5).
6.6.7	+	D/A	Students connect their understanding of percentages from earlier units to current work with equations of the form $px = q$ to find B in "$A\%$ of B is C" given A and C.
6.6.8	0	E	Students use diagrams where the variable is represented by a generic length to decide if expressions are equivalent, and they show that expressions are not equivalent by giving values of the variable that make them unequal. They identify simple equivalent expressions using familiar facts about operations.
6.6.9	+	D	This is the first of three lessons about the distributive property. In this lesson, students recall the use of rectangle diagrams to represent the distributive property and work with equations involving the distributive property with both addition and subtraction.
6.6.10	0	D	Students see that the distributive property can arise out of writing areas of rectangles in two different ways, which emphasizes the idea of equivalent expressions as being two different ways of writing the same quantity.
6.6.11	-	A	An optional lesson to practice identifying and writing equivalent expressions using the distributive property.
6.6.12	+	E	This lesson extends previous work with expressions in which a number is squared or cubed by considering exponent notation for any positive whole number exponent.
6.6.13	+	D	Students write, interpret, and evaluate expressions with exponent notation where the exponents are whole numbers and the bases may be whole numbers, fractions, or decimals. Students also apply their new understanding from earlier in the unit about determining whether equations are true or false.
6.6.14	+	D	Students use context to evaluate expressions that have an exponent and one other operation by carrying out operations in the conventional order.

6.6.15	0	A	Students work with expressions with variables and exponents, bringing together several themes from the unit.
6.6.16	0	E	First of two lessons that apply a new understanding of algebraic expressions and equations to represent relationships between two quantities. Students use and make connections between tables, graphs, and equations that represent these relationships.
6.6.17	0	D	Students use their representations to compare rates and consider how each of the representations would change if the independent and dependent variables were switched.
6.6.18	-	A	This lesson is optional. It offers opportunities to look at multiple representations (equations, graphs, and tables) for some different contexts.
6.6.19	-	A	Students examine given relationships, matching an equation and a table that represent the same relationship. Students then use multiple representations to explain their understanding to others.