Unit A - *Building Blocks*

Overview

This first unit gives students the essential tools they will use throughout their work in math including:

- extending the number system to include integers
- the concept of a variable and how it can be manipulated
- solving algebraic equations and giving a clear argument to justify a solution.

During this unit, students will review working with decimal operations so they are ready to work with rational numbers that include negatives in Unit C.

21st Century Capacities: Presentation, Analyzing

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP4 Model with Mathematics
MP6 Attend to precision
MP7 Look for and make use of structure

CC.7.NS.1a Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.
CC.7.NS.1b Understand $p + q$ as the number located a distance $|q|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
CC.7.NS.1c Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts
CC.7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers.
CC.7.NS.2a Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to

Transfer:

Students will be able to independently use their learning in new situations to...

1. Present a solution that is supported by an argument that is clear to the audience (Presentation)
2. Manipulate equations/expressions or objects to create order and establish relationships. (Analyzing)

Meaning:

UNDERSTANDINGS: *Students will understand that:*	ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*
1. Mathematicians represent and analyze mathematical situations and structures using algebraic symbols.	A. How do I decide if my answer makes sense, and if not, what do I do?
2. Mathematicians examine mathematical relationships to discern a pattern or structure.	B. How is thinking algebraically different from thinking arithmetically?
3. Mathematicians compare the effectiveness of two arguments, and—if there is a flaw in an argument—explain what it is.	C. What symbols are used to represent the world we live in?
	D. What strategies do mathematicians use when solving problems to ensure consistent answers?

	Acquisition:	
satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. **CC.7.NS.2b** Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts. **Use properties of operations to generate equivalent expressions.** **CC.7.EE.1** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. **CC.7.EE.2** Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. **Solve real-life and mathematical problems using numerical and algebraic expressions and equations.** **CC.7.EE.3** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations as strategies to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. **CC.7.EE.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. **CC.7.EE.4a** Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.	*Students will know…* 1. That every number (other than zero) has an opposite number 2. That absolute value represents a distance 3. Explain how -2^2 and $(-2)^2$ are different 4. Vocabulary: power, base, exponent, square, cube, square root, distribute, opposite, absolute value, term, like term, variable, constant, integer, expression, equation	*Students will be skilled at…* 1. Expressing repeated multiplication with an exponent 2. Evaluating an exponent 3. Finding the square root of a number 4. Using the order of operations to simplify an expression 5. Translating between words and expressions 6. Using substitution to simplify an expression 7. Combining like terms 8. Distributing a number into an algebraic expression 9. Completing a function table 10. Comparing integers using <,> or = 11. Ordering integers 12. Plotting points on the coordinate plane 13. Using all four operations with integers 14. Solving equations with one or two steps, including distributing, and showing the steps used to arrive at a solution