MTH 1W: Algebraic Expressions

LESSON OVERVIEW:

Scope and Sequence – Main Lesson Topics	Prior Knowledge	Vocabulary
• **Algebraic Expressions** • evaluating algebraic expressions at given values • modelling with algebraic expressions	• BEDMAS • Fraction Operations	• Variable • Generalization • Term • Expression • Evaluate • Operations

Learning Objectives	Curriculum Expectations
I can: • Substitute numeric vaules for variables so that I can evaluate the expression • Create algebraic expressions to represent (generalize) words problems, tables of values, pictures and graphs • Solve equations for different problems and check the accuracy of my solution • Create equations for different problems and check the accuracy of my solution	• C1.2 create algebraic expressions to generalize relationships expressed in words, numbers, and visual representations, in various contexts • C1.5 create and solve equations for various contexts, and verify their solutions

1	**Lesson Introduction & Problem String *(see below)***	40 minutes

Introduction:

- Variables are letters, such as ***x*** or ***n*** that we use to represent a number.
- We can rewrite word statements into algebraic expressions. Six more than a number would be represented by ***n*** + 6
- Equations are algebraic expressions that are equal or equivalent. n + 6 = 9 is an equation. n + 6 = 18 ÷ 2 is also an equation.
- We evaluate expressions by substituting a numeric value for the variable.
  E.g., 2m + n when m=-3 and n = -1
  2(-3) + (-1) becomes (-6) + (-1) which becomes -7.

2	**Consolidation**	10 minutes

3	**Meaningful Notes**	10 minutes

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4	**Check Your Understanding**	15 minutes

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LESSON BACKGROUND:

Patterns are all around us. As humans we look for and notice patterns in our world. We pay attention to the important parts of the pattern, look for relationships or changes, and then we generalize about the patterns that we encounter. Often, we use algebra in our daily lives without realizing it. Like when we determine times and distances when driving. Or when we try to figure out how much we will get paid on our next pay cheque. Algebra is a helpful way to express generalizations in a mathematical way.

(Paying Attention to Algebraic Reasoning

- Mathematicians use algebra to represent and explain relationships.
- Algebra also helps us to recognize and describe changes that we see.
- When we use variables we abe able to efficiently describe relationships that can also be described using words.
- Algebra also helps up to recognize the relationships among quantities and operations

Equations – a mathematical statement that two expressions are equal

Evaluate – to substitute a value for each variable in an expression, then simplify: to find the answer

Expression – a mathematical phrase made up of numbers and or variables connected by operations

Operation – a mathematical process or action such as addition, subtraction, multiplication, or division

Variable – a letter or symbol that represents a number or quantity that can vary

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PROBLEM	HINTS	EXTENSIONS
$13-x$ for $x=5$	• Read this out loud: Thirteen minus something. • What is that something? How do you know? • Try: $x+2$ $5+x$ $x-2$	• Try: $x-15$ • What if the value of x was negative?
$\frac{x}{15}$ for $x=30$	• Read this out loud: Something divided by 15 • What is that something? How do you know? • Does this look like something that you have done before?	• Try: $\frac{x+5}{5}$ $\frac{x-10}{10}$
$4x-3$ for $x=4$	• What (operation) is happening between the 4 and the *x*? • How might you read or say this expression? • Does this look like a problem you have done before? • How does this compare to the question we just completed? • How is it the same? How is it different? • What might you do first? Second? How do you know?	• Try: $3x-15$ $-5x+10$
$5(2x-3)$ for $x=-2$	• Let's think of the word BEDMAS. What should we attack first? How do you know? • Does this look like a problem you have done before? • How does this question compare to a previous one you have completed? How is it the same? How is it different? • What might you do next? Why that step?	• Try: $-2(x-13)$ $3(-2x-1)$
$5x^2-30$ for $x=3$	• Let's think of the word BEDMAS. What should we attack first? What can you recall about powers and exponents? • Does this look like a problem you have done before? • How does this question compare to a previous one you have completed? How is it the same? How is it different? • What is the result of x^2? What would your next step be? Why?	• Try: $-3x^2+20$ • How might the result change if the value of the variable was negative? Why **doesn't** it change the result here?
$2x^2+3x-10$ for $x=-3$	• What do you know? What are you being asked to do? Where might you start? • Is there a simpler problem you can try? • Does this look like a problem you have done before? • How does this question compare to a previous one you have completed? How is it the same? How is it different? •	• Try: $-4x^2-3x-5$

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PROBLEM	HINTS	EXTENSIONS
$2(4x-10)^2$ for $x=2$	• Using BEDMAS, what should we attack first? • Does this look like a problem you have done before? • How does this question compare to a previous one you have completed? How is it the same? How is it different? • We have to simplify everything INSIDE the brackets before we can move on to the next letter in BEDMAS	• Try: $-3(2x+5)^2$
$\frac{5x+9}{3}$ for $x=3$	• Does this look like a problem you have done before? • How does this question compare to a previous one you have completed? How is it the same? How is it different? • Try simplifying the top first!	• Try: $\frac{-2x^2+9}{3}$
$\frac{1}{3}x-\frac{1}{2}y$ for $x=-6,\ y=10$	• Does this look like a problem you have done before? • How does this question compare to a previous one you have completed? How is it the same? How is it different? • Recall multiplying unit fractions by a whole number. Be careful with the negative!	• Try: $\frac{2}{3}x+\frac{3}{5}y$
$3x+6y$ for $x=-\frac{1}{9},\ y=\frac{1}{12}$	• Does this look like a problem you have done before? • How does this question compare to a previous one you have completed? How is it the same? How is it different? • There's going to be a bit more than just a few steps here.	• Try: $-6x+8y$

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Teacher Observations/To Go Back to During Gallery Walk:

