# **Unit 3: Expressions and Equations**

| Mathematics        |
|--------------------|
| Math - Grade 6     |
| 3rd Marking Period |
| 8 weeks            |
| Published          |
|                    |

#### **Unit Overview**

SWBAT:

- Write and evaluate expressions as well as apply the properties of operations to generate equivalent expressions. (Chapter 6)
- Write and solve one-variable addition, subtraction, multiplication, and division equations. (Chapter 7)
- Reason with and solve one-variable inequalities as well as understand ordering and absolute value of rational numbers. (Chapter 8)

#### Transfer

Students will be able to independently use their learning to solve real world situations involving:

- solving problems utilizing exponents.
- solving problems utilizing order of operations.
- algebraic reasoning.
- mental math including guess, check, and revise.

#### Meaning

#### Understandings

Students will understand:

- the vocabulary associated with the unit.
- the basics of algebraic thinking.

#### **Essential Questions**

- How does the structure of equations and/or inequalities help us solve equations and/or inequalities?
- How does the substitution process help in solving problems?
- Why are variables used in equations? What might a variable represent in a given situation?
- How are inequalities represented and solved?

### **Application of Knowledge and Skill**

#### Students will know...

Students will know:

- the vocabulary that is associated with the unit.
- which operations to use when solving real-world algebraic problems.
- how to write expressions and equations based on real-world situations.
- the difference between independent and dependent variables.

#### Students will be skilled at...

Students will be skilled at:

- representing numbers using exponents.
- using order of operations to complete problems.
- evaluating algebraic expressions.
- ex) Use the replacement set  $\{6, 12, 24\}$  to find which values will make the equation 3x + 12 = 36 x true.
- writing verbal phrases as algebraic expressions/equations.
- using properties to simplify expressions/equations.
- using the Distributive Property.

- ex) Choose the answer from the drop-down menu that correctly completes the sentence is an equivalent expression for 3(2 n).
- ex) Which expression is equivalent to 4 + 3(2 + 4x)
- writing and solving one-step equations.
- writing, solving, and graphing functions and inequalities.
- completing function tables.
- writing and extending sequences.

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• Diva wanted to make a flower arrangement for her friend's birthday. She wanted <sup>3</sup> of the flowers in the arrangement to be roses. She had 12 roses with her. If she used all the roses for the arrangement, how many other flowers did she need for the arrangement?

#### Academic Vocabulary Chapter 6

algebra, algebraic expression, Associative Properties, base, coefficient, Commutative Properties, constant, defining the variable, Distributive Property, equivalent expressions, evaluate, exponent, factor the expression, Identity Properties, like terms, numerical expression, perfect square, powers, properties, term, variable

#### Chapter 7

Addition Property of Equality, Division Property of Equality, equals sign, equation, expressions, inverse operations, Multiplication Property of Equality, solution, solve, Subtraction Property of Equality

#### Chapter 8

arithmetic sequence, dependent variable, function, function rule, function table, geometric sequence, independent variable, inequality, linear function, sequence, term

#### Learning Goal - Chapter 6 - Expressions

SWBAT

• write and simplify expressions using properties.

# Daily Target - Chapter 6 - Expressions

SWBAT:

• Lesson 1 - identify parts of an expression using mathematical terms and write numerical expressions (DOK 2)

- Lesson 2 write and evaluate whole number exponents (DOK 2)
- Lesson 3 evaluate an expression with a value raised to a power and one other operation (DOK 2)
- Lesson 4 evaluate expressions with multiple operations (no parentheses) using order of operations (DOK 2)
- Lesson 5 write, read and evaluate expressions with unknown values (DOK 2)
- Lesson 6 write, read, and evaluate expressions with variables in real-world situations (DOK 3)
- Lesson 7 identify terms, factors, and coefficients in an expression as well as apply properties to find equivalent expressions (DOK 2)
- Lesson 8 evaluate expressions including variables (DOK 2)
- Lesson 9 use the Distributive Property to find equivalent expressions (DOK 2)

| MA.K-12.1    | Make sense of problems and persevere in solving them.   |
|--------------|---|
| MA.K-12.2    | Reason abstractly and quantitatively.   |
| MA.K-12.3    | Construct viable arguments and critique the reasoning of others.  |
| MA.K-12.4    | Model with mathematics.   |
| MA.K-12.6    | Attend to precision.  |
| MA.K-12.7    | Look for and make use of structure.   |
| MA.K-12.8    | Look for and express regularity in repeated reasoning.  |
| MA.6.EE.A.1  | Write and evaluate numerical expressions involving whole-number exponents.  |
| MA.6.EE.A.2  | Write, read, and evaluate expressions in which letters stand for numbers.   |
| MA.6.EE.A.2a | Write expressions that record operations with numbers and with letters standing for numbers.  |
| MA.6.EE.A.2b | 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.   |
| MA.6.EE.A.2c | 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). |
| MA.6.EE.A.3  | Apply the properties of operations to generate equivalent expressions.  |
| MA.6.EE.A.4  | Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).  |
| MA.6.EE.B.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.  |

#### **Daily Target - Chapter 7 - Equations**

SWBAT:

- Lesson 1 generate equations using equivalent expressions (DOK 2)
- Lesson 2 use substitution to solve equations using a data set (DOK 2)
- Lesson 3 write and solve real-world additon equations including a variable (DOK 3)
- Lesson 4 write and solve real-world multiplication equations including a variable(DOK 3)

- Lesson 5 define independent variable and dependent variable as well as use them to represent two quantities in a real-world context (DOK 3)
- Lesson 6 write and equation with an independent and dependent variable and analyze the situation (DOK 4)
- Lesson 7 analyze the relationship between independent and dependent varaibles(write an equation) using graphs and tables (DOK 4)
- Lesson 8 generate tables and graphs that describe real world situations that can be described using an equation (DOK 3)
- Lesson 9 write equations from points plotted on the coordinate plane (DOK 3)

| MA.K-12.1   | Make sense of problems and persevere in solving them.  |
|-------------|--|
| MA.K-12.2   | Reason abstractly and quantitatively.  |
| MA.K-12.3   | Construct viable arguments and critique the reasoning of others.   |
| MA.K-12.4   | Model with mathematics.  |
| MA.K-12.5   | Use appropriate tools strategically.   |
| MA.K-12.6   | Attend to precision.   |
| MA.K-12.7   | Look for and make use of structure.  |
| MA.K-12.8   | Look for and express regularity in repeated reasoning.   |
| MA.6.EE.A.4 | Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).   |
| MA.6.EE.B.5 | Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.  |
| MA.6.EE.B.6 | Use variables to represent numbers and write expressions when solving a real-<br>world or mathematical problem; understand that a variable can represent an<br>unknown number, or, depending on the purpose at hand, any number in a<br>specified set.   |
| MA.6.EE.B.7 | Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which $p$ , $q$ and $x$ are all nonnegative rational numbers.  |
| MA.6.EE.C.9 | Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. |

#### **Daily Target - Chapter 8 - Inequalities**

SWBAT:

- Lesson 1 compare integers in real-world context (DOK 2)
- Lesson 2 compare using absolute value (DOK 2)
- Lesson 3 compare integers on a number line (DOK 2)

- Lesson 4 compare two quantities when one is unknown (DOK 2)
- Lesson 5 write an inequality with a variable to represent a real-world situation (DOK 3)
- **Lesson 6** represent solutions of inequalities on a number line (DOK 2)
- Lesson 7 use substitution to solve and graph inequalities as well as explain why there are infinite solutions (DOK 2)
- Lesson 8 understand that there are limitations on inequalities (DOK 3)
- Lesson 9 write an inequality to respresent a real world situation (DOK 3)

| MA.K-12.1   | Make sense of problems and persevere in solving them.  |
|-------------|--|
| MA.K-12.2   | Reason abstractly and quantitatively.  |
| MA.K-12.3   | Construct viable arguments and critique the reasoning of others.   |
| MA.K-12.4   | Model with mathematics.  |
| MA.K-12.6   | Attend to precision.   |
| MA.K-12.7   | Look for and make use of structure.  |
| MA.K-12.8   | Look for and express regularity in repeated reasoning.   |
| MA.6.EE.B.5 | Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.                |
| MA.6.EE.B.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.   |
| MA.6.EE.B.7 | Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which $p$ , $q$ and $x$ are all nonnegative rational numbers.  |
| MA.6.EE.B.8 | Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real- world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams. |

#### **Summative Assessment**

Adaptive Practice

**Group Presentation** 

Chapter Test

**Chapter Project** 

#### **21st Century Life and Careers**

Act as a responsible and contributing citizen and employee.

| CRP.K-12.CRP1.1  | Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.                    |
|------------------|--|
| CRP.K-12.CRP2    | Apply appropriate academic and technical skills.   |
| CRP.K-12.CRP2.1  | Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.  |
| CRP.K-12.CRP4    | Communicate clearly and effectively and with reason.   |
| CRP.K-12.CRP4.1  | Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome. |
| CRP.K-12.CRP6    | Demonstrate creativity and innovation.   |
| CRP.K-12.CRP6.1  | Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.   |
| CRP.K-12.CRP8    | Utilize critical thinking to make sense of problems and persevere in solving them.   |
| CRP.K-12.CRP8.1  | Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.   |
| CAEP.9.2.8.B.3   | Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.   |
| CAEP.9.2.8.B.6   | Demonstrate understanding of the necessary preparation and legal requirements to enter the workforce.  |
| TECH.8.1.8.D     | Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.   |
| TECH.8.1.8.D.1   | Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.   |
| TECH.8.1.8.D.CS1 | Advocate and practice safe, legal, and responsible use of information and technology.  |
| TECH.8.1.8.D.CS2 | Demonstrate personal responsibility for lifelong learning.   |

## Formative Assessment and Performance Opportunities

- Academic Game
- BrainPop
- Centers
- Class Discussions
- Clickers
- Do Now
- Exit Ticket
- Graphic Organizer
- Project
- Quiz
- Self-Assessment
- Student Teacher
- Teacher Interview
- Teacher Observation
- Think, Pair, Share

#### **Accommodations and Modifications**

- Teacher provides notes for student(s)
- Teacher will modify test for student(s)
- Students may use graph paper to help organize data
- A word bank can be provided
- Leveled centers can be used
- Small group instruction can be utilized
- Calculators may be used
- Extra Practice Board can be utilized to review pre-requisite skills
- Interactive games/websites may be used to practice skills
- Teacher can conference with student(s) to "check-in"
- Manipulative (Algebra Tiles) can be used

#### **Unit Resources**

cK 12 - www.ck12.org

http://www.commoncoresheets.com/index.php) Common Core aligned Worksheets

**Interdisciplinary Connections** Discuss how genetic and environmental factors affect growth (independent and dependent variables.) (6.EE.C)

| 6-8.MS-ESS2-2        | Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.                   |
|----------------------|--|
| 6-8.MS-ESS2-2.3      | Scale Proportion and Quantity  |
| 6-8.MS-LS1-1         | Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.           |
| 6-8.MS-LS1-2         | Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function.                              |
| 6-8.MS-LS1-3         | Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.                                     |
| 6-8.MS-LS1-6         | Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. |
| 6-8.MS-LS1-5.LS1.B.1 | Genetic factors as well as local conditions affect the growth of the adult plant.  |