Unit 02: Expressions and Equations

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **FY**
Status: **Published**

Standards Alignment

New Jersey Student Learning Standards

MA.6.NS	The Number System
MA.6.NS.B	Compute fluently with multi-digit numbers and find common factors and multiples.
MA.6.NS.B.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
MA.6.EE	Expressions and Equations
MA.6.EE.A	Apply and extend previous understandings of arithmetic to algebraic expressions.
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	Reason about and solve one-variable equations and inequalities.
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.

MA.6.EE.C	Represent and analyze quantitative relationships between dependent and independent variables.
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.
AAAA.K-12.1	Inquire, think critically, and gain knowledge.
AAAA.K-12.1.3	Responsibilities
AAAA.K-12.1.3.5	Use information technology responsibly.
AAAA.K-12.2.1	Skills
AAAA.K-12.2.1.4	Use technology and other information tools to analyze and organize information.
AAAA.K-12.3	Share knowledge and participate ethically and productively as members of our democratic society.
AAAA.K-12.3.1	Skills
AAAA.K-12.3.1.6	Use information and technology ethically and responsibly.

Integration of Career Readiness, Life Literacies and Key Skills

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Technology / Integration of Computer Science and Design Thinking

TECH.8.1.8	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.8.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
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.5	Understand appropriate uses for social media and the negative consequences of misuse.

Interdisciplinary Connections: NJSLS for ELA, Social Studies, Science and/or Math Section

Capacities of the Literate Individual
Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language

They demonstrate independence.

They build strong content knowledge.

They respond to the varying demands of audience, task, purpose, and discipline.

They comprehend as well as critique.

They value evidence.

They use technology and digital media strategically and capably.
They come to understand other perspectives and cultures.

LA.K-12.NJSLSA.R	Reading
MATH.K-12.1	Make sense of problems and persevere in solving them
	Key Ideas and Details
MATH.K-12.2	Reason abstractly and quantitatively
LA.K-12.NJSLSA.R1	Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
LA.RL.6.1	Cite textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.
MATH.K-12.3	Construct viable arguments and critique the reasoning of others
MATH.K-12.4	Model with mathematics
MATH.K-12.5	Use appropriate tools strategically
MATH.K-12.6	Attend to precision
MATH.K-12.7	Look for and make use of structure
MATH.K-12.8	Look for and express regularity in repeated reasoning
LA.K-12.NJSLSA.W	Writing
	Text Types and Purposes

LA.K-12.NJSLSA.W1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
LA.W.6.1	Write arguments to support claims with clear reasons and relevant evidence.
LA.W.6.1.A	Introduce claim(s) and organize the reasons and evidence clearly.
LA.W.6.1.B	Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.
LA.W.6.1.C	Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.
LA.K-12.NJSLSA.SL	Speaking and Listening
LA.W.6.1.D	Establish and maintain a formal/academic style, approach, and form.
	Comprehension and Collaboration
LA.W.6.1.E	Provide a concluding statement or section that follows from the argument presented.
LA.K-12.NJSLSA.SL1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
LA.SL.6.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
LA.SL.6.1.A	Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
LA.SL.6.1.B	Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.
LA.SL.6.1.C	Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.
LA.SL.6.1.D	Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.

Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media LiteracyNew Section

see Crosswalks

21st Century Life and Careers

Stage I: Desired Results

Transfer/Overview/Rationale

Transfer / Overview / Rationale

Unit Rationale

The purpose of this unit…

In order to succeed in Algebra, students must be able to solve equations.

Meaning

Essential Questions

Essential Questions

- Why do we use mathematical expressions, equations and inequalities to model different real life situations?

- How do mathematical expressions, equations, and inequalities assist in analyzing and predicting relationships between two variables?

- How do the addition and multiplication properties of numbers help us to solve problems?

- Why is it necessary to identify independent and dependent variables to analyze a relationship between two quantities?

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

-To better understand the world in which we live, situations are modeled with expressions, equations and

inequalities.

-Developing number sense allows us to predict events.

-Understanding the way numbers work in our world allow us to overcome obstacles.

-Given a situation, knowing the cause and effect relationship created by numbers allows us to make better decisions

Acquisition (Student Learning Objectives)

Knowledge

Knowledge

Students will know…

- How to analyze, interpret, apply, sort information to solve a specific problem

- Given a situation add, subtract, multiply, divide fractions, mixed numbers and decimals to solve real-world problems

- Given a situation, use order of operations, substitution, and simplifying to create and evaluate expressions

- How to write and evaluate expressions, equations, and inequalities with one-variable

- Apply addition and multiplication properties of numbers and the distributive property to a variety of situations

- Use the properties of numbers to create, simplify and evaluate equivalent expressions

- How to analyze equations and inequalities using graphing, tables, and substitution to check the reasonableness of the solutions

- How to identify independent and dependent variables to create equations with two variable

Skills

Skills

Student will be skilled at …

- Write and graph symbolic representations of real-life situations using expressions, equations, and inequalities involving one or two variables.

- Simplify and evaluate expressions using the properties of addition, multiplication, and distributive property.

- Evaluate and graph one-step equations and inequalities of practical situations and confirm answers using substitution.

- Analyze and represent situations using graphs and tables.

- Identify, analyze and interpret independent and dependent variables to create and solve equations in two variables.

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

Unit 2 activities.docx
Unit 2- Cycle 7 inequality centers.doc
Unit 2 - PARCC practice.docx

Formative Assessment Strategies

Formative Assessment Strategies

- ixl.com scores
- tenmarks.com scores
- teacher center observation
- STEM projects

Learning Activities/Unit of Study

Learning Activities/Unit of Study

Expressions and Equations: Approximately 7 Cycles

Cycle 1: Topics Covered

- Evaluating Expressions
- Writing expressions

- Activities/Centers
    - IXL.com centers
        - X.1 Write variable expressions
        - X.2 Write variable expressions: word problems
        - X.3 Evaluate variable expressions with whole numbers

        - X.4 Evaluate multi-variable expressions
        - X.5 Evaluate variable expressions with decimals, fractions, and mixed numbers
    - Tenmarks centers
        - 6.EE.2a Translate Addition Sentences to Algebraic Expressions
        - 6.EE.2a Translate Subtraction Sentences to Algebraic Expressions
        - 6.EE.2a Translating Multiplication Sentences to Algebraic Expressions
        - 6.EE.2a Translating Division Sentences to Algebraic Expressions
        - 6.EE.2a Identifying Expressions that Represent Situations
    - Hands-On/Creative Centers
        - With a partner, create a chart identifying as many words as possible that mean add, subtract, multiply and divide.
        - Create answer cards and have students match cards http://www.kaganonline.com/catalog/look_whats_inside/blacklines/BKHSMAlgebra1.pdf
    - Online games
        - http://www.math-play.com/Algebraic-Expressions-Millionaire/algebraic-expressions-millionaire.html
    - Xtramath: review flashcards
    - Teacher Directed Stations
        - Bellringers: Week 33—page 226-227
        - Bellringers: Week 33—page 225
        - Teacher created problems on white boards: evaluate expressions
    - STEM activity: *always, sometimes, or never true* https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/6403-A4.pdf

Cycle 2: Topics Covered

- Properties of multiplication or addition
    - Commutative
    - Associative
    - Zero property

- Activities/Centers
    - IXL.com centers
        - X.7 Properties of addition
        - X.8 Properties of multiplication
    - Hands-On/Creative Centers
        - Associative property activity http://www.cengage.com/resource_uploads/downloads/0495810975_228517.pdf
        - a variety of worksheets on the properties to be completed in partners or a center per worksheet http://www.commoncoresheets.com/Properties.php
    - Online games
        - Name the property http://www.mathgames.com/skill/8.37-properties-of-addition-and-multiplication
    - Xtramath: review flashcards
    - Teacher Directed Stations
        - Bellringers: Week 32—page 223-224
        - Bellringers: Week 32—page 221-222
        - Teacher created problems on white boards: name that property
    - STEM activity: commutative property http://www.cpalms.org/Public/PreviewResourceLesson/Preview/28239

Cycle 3: Topics Covered

- Distributive property
- Combining like terms

- Activities/Centers
    - IXL.com centers
        - X.9 Distributive property
        - X.11 Write equivalent expressions using properties
        - X.12 Add and subtract like terms
        - X.13 Identify equivalent expressions
    - Tenmarks centers
        - 6.EE.3 Identify Equivalent Expressions: Distributive Property
        - 6.EE.4 Identifying Equivalent Expressions by Evaluation
        - 6.EE.5 Using Substitution to Determine Solutions
    - Hands-On/Creative Centers
        - Have you met your match? http://www.cpalms.org/Public/PreviewResourceLesson/Preview/49255
    - Online games
        - http://www.mathgames.com/skill/6.14-simplify-variable-expressions
    - Xtramath: review flashcards
    - Teacher Directed Stations
        - Bellringers: Week 32—page 219-220
        - Bellringers: Week 32—page 218
        - Teacher created problems on white boards: simplify expressions

Cycle 4: Topics Covered

- Writing equations in one variable

- Activities/Centers
    - IXL.com centers
        - Y.2 Which x satisfies an equation?
        - Y.3 Write an equation from words
        - Y.4 Model and solve equations using algebra tiles
        - Y.5 Write and solve equations that represent diagrams
    - Tenmarks centers
        - 6.EE.6 Writing Equations Using Variables
        - 6.EE.9 Independent and Dependent Variables and Equations
        - 6.EE.7 Solving Word Problems Involving Equations
    - Hands-On/Creative Centers
        - Several activities on writing equations from words http://betterlesson.com/lesson/460459/deciphering-word-problems-to-write-equations
    - Online games
        - http://www.mathgoodies.com/lessons/vol7/equations.html
    - Xtramath: review flashcards
    - Teacher Directed Stations
        - Bellringers: Week 31—page 216-217
        - Bellringers: Week 31—page 214-215

Cycle 5: Topics Covered

- Solving one-step linear equations

- Activities/Centers
  - IXL.com centers
    - Y.4 Model and solve equations using algebra tiles
    - Y.5 Write and solve equations that represent diagrams
    - Y.6 Solve one-step equations with whole numbers
    - Y.7 Solve one-step equations with decimals, fractions, and mixed numbers
    - Y.8 Solve one-step equations: word problems
  - Tenmarks centers
    - 6.EE.6 Writing Equations Using Variables
    - 6.EE.9 Independent and Dependent Variables and Equations
    - 6.EE.7 Solving Word Problems Involving Equations
  - Hands-On/Creative Centers
    - Whole class activity: One-step equations bingo file:///C:/Users/KKemeny/Downloads/OneStepEquationsBingoGameFREE.pdf
  - Online games
    - One-step equation battleship https://www.quia.com/ba/36544.html
  - Xtramath: review flashcards
  - Teacher Directed Stations
    - Bellringers: Week 31—page 209-210
    - Bellringers: Week 31—page 208
    - Teacher created problems on white boards: solve one-step equations
  - STEM activity:

    http://www.cpalms.org/Public/PreviewResourceLesson/Preview/71402

Cycle 6: Topics Covered

- Write equations with two variables
- Identify the independent and dependent variables

- Activities/Centers
  - IXL.com centers
    - AA.1 Does (x, y) satisfy an equation?
    - AA.2 Identify independent and dependent variables
    - AA.3 Find a value using two-variable equations
    - AA.4 Solve word problems involving two-variable equations
    - AA.5 Complete a table for a two-variable relationship
    - AA.6 Write a two-variable equation
  - Tenmarks centers
    - 6.EE.6 Writing Equations Using Variables
    - 6.EE.9 Independent and Dependent Variables and Equations
    - 6.EE.7 Solving Word Problems Involving Equations
  - Hands-On/Creative Centers
    - Work with a partner to solve the word problems to become eqution

https://cdn.kutasoftware.com/Worksheets/PreAlg/Two-Step%20Word%20Problems.pdf
    - Online games
        - https://www.quia.com/pop/184568.html
    - Xtramath: review flashcards
    - Teacher Directed Stations
        - Bellringers: Week 30—page 206-207
        - Bellringers: Week 30—page 204-205
        - Teacher created problems on white boards: solve one-step equations
    - STEM activity: independent vs. dependent variable activity
      http://www.teachforever.com/2007/10/project-idea-independent-vs-dependent.html

Cycle 7: Topics Covered

- Writing and solving inequalities
- Solving one-step inequalities

- Activities/Centers
    - IXL.com centers
        - Z.1 Solutions to inequalities
        - Z.2 Write inequalities from number lines
        - Z.3 Graph inequalities on number lines
        - Z.4 Solve one-step inequalities
        - Z.5 Graph solutions to one-step inequalities
    - Tenmarks centers
        - 6.EE.8 Solving Word Problems Involving Inequalities
    - Hands-On/Creative Centers
        - Several centers to graph, create, and solve inequalities in one variable*
        - http://www.cpalms.org/Public/PreviewResourceLesson/Preview/48726
    - Online games
        - http://mrnussbaum.com/geniusboxing/
        - https://www.ltcconline.net/greenl/java/BasicAlgebra/inequalityGame/inequalities.html
        - https://www.quia.com/rr/438640.html
    - Xtramath: review flashcards
    - Teacher Directed Stations
        - Bellringers: Week 30—page 202-203
        - Bellringers: Week 30—page 201
        - Teacher created problems on white boards: graph inequalities
        - PARCC practice*

Modifications and/or Accommodations

Suggested Modifications (ELL, Sp. Ed, GIfted, At-risk of Failure)

English Language Learners

Native language support: The teacher provides auditory or written content to students in their native language.

Adjusted Speech: The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

Visuals: The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students better understand and comprehend the subjects at hand.

Front-Loading Vocabulary: The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

Special Education Students

Chunking: The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

Checking for Understanding: It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the concepts being covered in a way that makes sense to them.

Extra time: The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

Oral Reading: The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

Timers: The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how much time they have to complete an assignment.

Students with 504 Plans

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Gifted & Talented Strategies

Extensions/Enrichments: Teachers will provide gifted and talented students with extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

Modify/Change Activities: Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

Students at Risk of School Failure

Directions or Instructions: Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure he/she hasn't forgotten.

Peer Support: Peers can help build confidence in other students by assisting in peer learning. Many teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

Alternate or Modified Assignments: Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just may be that you will need to assign an alternate assignment.

Increase One to One Time: When other students are working, always touch base with your students at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

Contracts: It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

Hands On: As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

Tests/Assessments: Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

Seating: Seat students near a helping peer or with quick access to the teacher. Those with hearing

or sight issues need to be close to the instruction which often means near the front.