Unit 4: Expressions and Equations
6th Grade Mathematics
17 Class Meetings

Revised June 2022

Isaac Rubric (#4- Problem Solving) **Essential Questions**

- How can you apply the properties of operations to generate equivalent expressions?
- In what ways can you reason and solve one-variable equations and inequalities?

Enduring Understandings with Unit Goals

EU 1: Numerical expressions can be evaluated using the order of operations while algebraic expressions can be used to represent real-world situations where variables represent unknown quantities or quantities that vary.
- Evaluate expressions involving exponents
- Write and evaluate algebraic expressions

EU 2: A solution to an equation or inequality represents the value(s) for the variable that, when substituted in, make the equation or inequality a true statement.
- Solve one-step equations using all operations
- Write, graph, and solve inequalities

EU 3: An equation can be used to model the association between two quantities where one quantity is considered the independent variable and the other quantity is the dependent variable.
- Write and graph ratio situations
- Use tables, graphs, and equations to represent the relationship between quantities

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Standards

Common Core State Standards:
- **6.EE.A.1:** Write and evaluate numerical expressions involving whole-number exponents.
- **6.EE.A.2:** Write, read, and evaluate expressions in which letters stand for numbers.
- **6.EE.A.2.A:** Write expressions that record operations with numbers and with letters standing for numbers.
- **6.EE.A.2.B:** 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.
- **6.EE.A.2.C:** 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).
- **6.EE.A.3:** Apply the properties of operations to generate equivalent expressions.
- **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).
- **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.

- **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.
- **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.
- **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.
- **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. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time

ISAAC Vision of the Graduate Competencies

Competency 1: Write effectively for a variety of purposes.
Competency 2: Speak to diverse audiences in an accountable manner.
Competency 3: Develop the behaviors needed to interact and contribute with others on a team.
Competency 4: Analyze and solve problems independently and collaboratively.
Competency 5: Be responsible, creative, and empathetic members of the community.

Unit Content Overview

- **Numerical Expressions with Exponents**
- What are exponents
- Evaluate numerical expressions involving whole number exponents
- Vocabulary-order of operations, exponents, numerical expression

- **Algebraic Expressions**
- Use variables to write expressions
- Evaluate expressions
- Write expressions for verbal statements
- Vocabulary-variable, term, sum, difference, product, quotient, equivalent

- **Equivalent Expressions**
- Identify equivalent expressions
- Distributive property
- Write algebraic expressions
- Vocabulary-commutative property, distributive property, algebraic expression, term, variable

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- **Equations**
- Define and identify solutions
- Write equations for real-world situations
- Solve one step equations using addition and subtraction
- Solve one step equations using multiplication and division
- Vocabulary-equation, solution, substitution, sum, difference, product, quotient

- **Inequalities**
- Define and identify solutions
- Write and graph inequalities
- Solve one step inequalities
- Vocabulary- equation, solution, variable, term, substitution, sum, difference, product, quotient

- **Representing Relationships**
- Write equations for and graph ratio situations
- Identify independent and dependent variables
- Represent the relationship between two quantities using tables, graphs, and equations
- Vocabulary- equation, solution, variable, term, substitution, sum, difference, product, quotient, independent variable, dependent variable

Interdisciplinary Connection:
- Language Arts - Word Problems
- Science –
  - Unit 2: Water Cycle & Weather Patterns

Daily Learning Objectives with *Do Now Activities*

Students will be able to…
- Build and evaluate identities for the relationships between addition & subtraction and multiplication & division.
  - Do Now- Simplify expressions and combine like terms
- Write and evaluate numerical expressions involving whole number exponents
  - Do Now- Simplify expressions and combine like terms
- Apply the Order of Operations to evaluating given problems and expressions
  - Do Now- Divide fractions and write integers for a given situation
- Compose expressions that record operations with numbers and variables using mathematical terms.
  - Do Now- Divide fractions and write integers for a given situation
- Evaluate algebraic expressions when given a value for the variable.
  - Do Now- Divide fractions and write integers for a given situation
- Apply the Associative Commutative Properties to addition and multiplication to evaluate equivalent expressions

- o Divide fractions and write integers for a given situation
- Write equivalent expressions using algebra tiles to simplify expressions.
  - o Do Now-Use coordinate planes and number lines to answer questions
- Create equivalent algebraic expressions using the distributive property to factor and expand expressions
  - o Do Now- Use coordinate planes and number lines to answer questions
- Calculate solutions to one step equations using addition and subtraction
  - o Do Now- Use coordinate planes and number lines to answer questions
- Calculate solutions to one step equations using addition and subtraction
  - o Do Now- Use coordinate planes and number lines to answer questions
- Solve one step equations using multiplication and division
  - o Do Now- Answer questions involving a number line.
- Generate solutions to inequalities
  - o Do Now- Answer questions involving a number line.
- Model the solutions to one step inequalities on a number line
  - o Do Now- Answer questions involving a number line.
- Analyze the relationship between the dependent and independent variables using equations, graphs, and tables
  - o Do Now- Answer questions involving a number line.

Instructional Strategies/Differentiated Instruction

- Whole group instruction
- Guided notes
- Student-led instruction/discussions
- Independent problem-solving
- Collaborative problem-solving
- Graphic Organizer
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Homework
- Word walls with visuals
- Small group instruction
- Manipulatives
- Interactive Notebook
- Highlighted directions

EL DIFFERENTIATED INSTRUCTION:
- Word Walls with visuals
- TWPS (Think, Write, Pair, Share)
- Pre-reading strategies
- Culturally responsive teaching
- Explicit Modeling

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- Key Vocabulary
- Graphic Organizers
- Strategic Grouping
- Non-verbal Assessments
- Modified classwork and homework

Assessments

FORMATIVE ASSESSMENTS:
- Warm-ups (SBAC)
- Whiteboards
- Mid-class check-ins
- Exit Slips
- Accountable Talk Discussions
- Do Now
- Student-led instruction
- Homework

SUMMATIVE ASSESSMENTS:
- Quiz - EU 1 and EU 2 (Edulastic)
- Quiz - EU 3 and EU 4(Edulastic)
- Performance Task- How Hot is it? - Isaac Rubric (#4- Problem Solving)
- IAB- Expressions & Equations
- IAB- Performance Task- Cell Phone Plan

Unit Task

Unit Task Name: How Hot is it?

Description: In this task, students will have to convert Celsius temperatures to Fahrenheit and vice a versa. Students will use substitution in algebraic equations, order or operations, grouping symbols, creating graphs and analyzing data tables to help complete the task.

Evaluation: Summative Assessment and Problem Solving Rubric

Unit Resources

- Engageny
- Math In Focus
- Math Antics
- State Common Core Standards Transition Tasks
- Edulastic
- Match Fishtank
- Khan Academy

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- www.map.mathshell.org
- Worksheets
- Calculator
- Laptops
- SBAC Prep Online