Unit 3: Equal or Not
Key Standards

M8A1. Students will use algebra to represent, analyze, and solve problems.

a. *Represent a given situation using algebraic expressions or equations in one variable.*

b. *Simplify and evaluate algebraic expressions.*

c. *Solve algebraic equations or inequalities in one variable, including those involving absolute values.*

d. *Solve equations involving several variables for one variable in terms of the others.*

e. *Interpret solutions in problem contexts.*

Unit 3: Equal or Not
Key Standards

M8A2. Students will understand and graph inequalities in one variable.

a. Represent a given situation using an inequality in one variable.

b. Use the properties of inequality to solve inequalities.

c. Graph the solution of an inequality on a number line.

d. Interpret solutions in problem contexts.

GPS Math Process Standards

P1. Students will solve problems (using appropriate technology).

a. Build new mathematical knowledge through problem solving.

b. Solve problems that arise in mathematics and in other contexts.

c. Apply and adapt a variety of appropriate strategies to solve problems.

d. Monitor and reflect on the process of mathematical problem solving.

P2. Students will reason and evaluate mathematical arguments.

a. Recognize reasoning and proof as fundamental aspects of mathematics.

b. Make and investigate mathematical conjectures.

c. Develop and evaluate mathematical arguments and proofs.

d. Select and use various types of reasoning and methods of proof.

GPS Math Process Standards

P3. Students will communicate mathematically.

a. Organize and consolidate their mathematical thinking through communication.

b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.

c. Analyze and evaluate the mathematical thinking and strategies of others.

d. Use the language of mathematics to express mathematical ideas precisely.

GPS Math Process Standards

P4. Students will make connections among mathematical ideas and to other disciplines.

a. Recognize and use connections among mathematical ideas.

b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

c. Recognize and apply mathematics in contexts outside of mathematics.

P5. Students will represent mathematics in multiple ways.

a. Create and use representations to organize, record, and communicate mathematical ideas.

b. Select, apply, and translate among mathematical representations to solve problems.

c. Use representations to model and interpret physical, social, and mathematical phenomena.

Unit 3: Equal or Not
Concepts & Skills to Maintain

- Proportional reasoning
- Evaluate algebraic expressions
- Solve one and two step equations
- Operations with rational numbers
- Properties of equality

Unit 3: Equal or Not Enduring Understandings

- Algebraic expressions, equations and inequalities are used to represent relationships between numbers.
- Absolute value is used to represent distances between numbers.
- Graphs can be used to represent all of the possible solutions to a given situation.
- Many problems encountered in everyday life can be solved using equations or inequalities.

Unit 3: Equal or Not
Concepts & Skills for this unit

- use algebraic expressions, equations, or inequalities in one variable to represent a given situation;
- simplify and evaluate algebraic expressions, including those with exponents;
- solve and interpret algebraic equations and inequalities in one variable, including those with absolute values; and
- graph the solution of an equation or inequality on a number line.

Unit 3: Equal or Not Misconceptions and Errors

- There is no relationship between solving equations and solving inequalities.
- The absolute value of a number is always its opposite.
- To find the value of a number with an exponent, multiply the base by the exponent.

Unit 3: Equal or Not Terms & Symbols

- **Absolute Value:** The distance a number is from zero on the number line. Examples: $|-4| = 4$ and $|3| = 3$
- **Addition Property of Equality:** For real numbers a, b, and c, if a = b, then a + c = b + c. In other words, adding the same number to each side of an equation produces an equivalent equation.
- **Additive Inverse:** Two numbers that when added together equal 0. Example, 3.2 and -3.2
- **Algebraic Expression**: A mathematical phrase involving at least one variable. Expressions can contain numbers and operation symbols.
- **Equation**: A mathematical sentence that contains an equals sign.

ATLANTA PUBLIC SCHOOLS
Making A Difference

Unit 3: Equal or Not Terms & Symbols

- **Evaluate an Algebraic Expression**: To perform operations to obtain a single number or value.
- **Inequality:** A mathematical sentence that contains the symbols >, <, ≥, or ≤.
- **Inverse Operation**: Pairs of operations that undo each other. Examples: Addition and subtraction are inverse operations and multiplication and division are inverse operations.
- **Like Terms:** Monomials that have the same variable raised to the same power. In other words, only coefficients of terms can be different.
- **Linear Equation in One Variable:** an equation that can be written in the form $ax + b = c$ where a, b, and c are real numbers and $a \neq 0$

Unit 3: Equal or Not Terms & Symbols

- **Multiplication Property of Equality:** For real numbers a, b, and c ($c \neq 0$), if a + b, then ac = bc. In other words, multiplying both sides of an equation by the same number produces an equivalent expression.
- **Multiplicative Inverses:** Two numbers that when multiplied together equal 1. Example: 4 and ¼.
- **Solution:** the value or values of a variable that make an equation a true statement
- **Solve:** Identify the value that when substituted for the variable makes the equation a true statement.
- **Variable**: A letter or symbol used to represent a number.

Unit 3: Equal or Not
Framework Unit Tasks

- Expanding Space Station
- Secret Codes
- Acting Out
- Making the Grade
- *Number Tricks*
- Go Fish!

Unit 3: Equal or Not Evidence of Learning

- use algebraic expressions, equations, or inequalities in one variable to represent a given situation;
- simplify and evaluate algebraic expressions, including those with exponents;
- solve and interpret algebraic equations and inequalities in one variable, including those with absolute values; and
- graph the solution of an equation or inequality on a number line.

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Making A Difference

Model Lesson
Unit 3: Equal or Not

Number Tricks

Pre-lesson Reflective Teacher Questions

- What is the lesson about?
- What prior knowledge do you think the students have?
- What unique considerations need to be included when planning for this group of students?

Pre-lesson Reflective Teacher Questions

- What manipulatives or tools can be used for conceptual modeling?
- What do you already know through pre-assessments or other formative assessments about their misconceptions and/or error patterns related to this concept?
- How do you think they will do?

Engage: Opening (Warm-Up)

Do the following sequence of operations in order:

1) **Write down any number. (This is your 'start' number.)**
2) **Add to it the number that comes before it.**
3) **Add 11.**
4) **Divide by 2.**
5) **Subtract your start number.**

b. What did you get for your final number?
c. Check with your partner, what did that person get for their final number?
d. Everyone should have the same number. What number is that?
e. Why did everyone end with the same number?
f. How does this trick work?

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Making A Difference

Standards/Elements

M8A1. Students will use algebra to represent, analyze, and solve problems.

a. Represent a given situation using algebraic expressions or equations in one variable.

b. Simplify and evaluate algebraic expressions.

c. Interpret solutions in problem contexts.

Explore: Opening (Mini-Review)

Sentence	Algebraic Equation
A number increased by nine is fifteen.	$y + 9 = 15$
Twice a number is eighteen.	$2n = 18$
Four less than a number is twenty.	$x - 4 = 20$
A number divided by six is eight.	$\frac{k}{6} = 8$

Explore: Opening (Mini-Review)

Sentence	Algebraic Equation
Twice a number, decreased by twenty-nine, is seven.	
Thirty-two is twice a number increased by eight.	
The quotient of fifty and five more than a number is ten.	
Twelve is sixteen less than four times a number.	

Explore/Explain: Opening (Mini-Lesson)

Now try this one:

1) **Take the number of your birth month.**
2) **Add 32.**
3) **Add the difference between your birth month number and 12.**
4) **Divide by 4.**
5) **Add 2.**

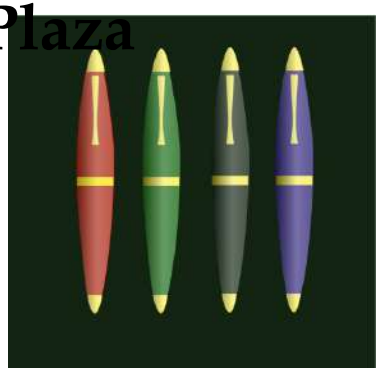
This is your Lucky Number!

- Do you feel lucky? Why or why not?
- Explain what made this trick work.

Elaborate: Station Activities (Work Period)

Teacher Directed

Practice Plaza



The Shop

Evaluate: Closing

It is time to show what you know…

Today we …

Tomorrow we will…

Homework Choice 1 or Homework Choice 2

Evaluate: Closing (Exit Ticket)

- Choose one of the 5 prompts to include in your Math Journal or Thinking Map as your Exit Ticket.

I feel I really understood…	I am unsure about…
I am curious to learn more about….	Today's lesson left me wondering about….
The thing I will remember most about this lesson is ….. because….	I continue to struggle with… because

Session Reflection Questions

1. Which strategies in this session are you most likely to use?

2. How would you adapt the strategies in this session to suit your needs?

3. What else would you like to know?