Unit Title	Being Rational in an Irrational World		**Length of Unit**	5 weeks
Focusing Lens(es)	Representation Interpretation	**Standards and Grade Level Expectations Addressed in this Unit**	MA10-GR.7-S.1-GLE.2 MA10-GR.7-S.2-GLE.2	
Inquiry Questions (Engaging-Debatable):	• What does it mean to "be in the red?" (MA10-GR.7-S.1-GLE.2-RA.1) • Do two negatives always make a positive?			
Unit Strands	The Number System, Expressions and Equations			
Concepts	Sum, distance, positive, negative, direction, additive inverse, subtraction, rational numbers, absolute value, difference, number line, decimal, equivalence, terminating decimal, repeating decimal, fraction, numerator, denominator, multiplication, division, distributive property, signed numbers, products, quotients, integers,			

Generalizations **My students will Understand that…**	**Guiding Questions** **Factual**	**Conceptual**
Every quotient of integers produces rational numbers provided that the divisor is not zero. (MA10-GR.7-S.1-GLE.2-EO.b.iii)	What is an integer? What is a rational number? How can you show 1/7 is rational? What are examples of irrational numbers?	Why is p/0 undefined? Why does the quotient of integers produce a rational numbers provided that the divisor is not zero?
Mathematicians express rational numbers in fractional form as a decimal equivalent that either terminates or eventually repeats (MA10-GR.7-S.1-GLE.2-EO.b.iv)	How do calculate the decimal equivalent for a fraction?	Why do some fractions convert to terminating decimals and others repeating decimals? (MA10-GR.7-S.1-GLE.2-IQ.4)
Mathematicians interpret the sum of rational numbers, $p + q$, as a number located a distance $\|q\|$ from p, in the positive or negative direction (MA10-GR.7-S.1-GLE.2-EO.a.iii)	How can number lines help visualize the possible answers to an addition problem?	When adding, why is it possible for the sum to be smaller than the initial quantity? How do you determine whether to move in the positive or negative direction from an initial quantity when adding?
Mathematicians use additive inverses to interpret subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. (MA10-GR.7-S.1-GLE.2-EO.a.iv)	What are additive inverses? What are situations in which opposite quantities combine to make 0? How can you use additive inverses to subtract rational numbers?	Why do additive inverses have a sum of zero? Why is subtraction of rational numbers equivalent to adding the additive inverse, p – q = p + (-q)?

Mathematicians represent the absolute value of the difference between to rational numbers as the distance between the numbers on a number line. (MA10-GR.7-S.1-GLE.2-EO.a.vii)	How can you represent the distance between two numbers on a number line? If you know the absolute value distance between two numbers, how can you determine if the difference between the two numbers is positive or negative?	Why is |p – q| equivalent to |q – p|?
Fraction multiplication and division extends to rational numbers. (MA10-GR.7-S.1-GLE.2-EO.b)	What are real world examples of multiplication of rational numbers, including negative rational numbers? How does the distributive property help us understand (-1)(-1) = 1 and the rules for multiplying signed numbers and quotients such as –(p/q) = (-p)/q = p/(-q)?	Why is a negative number multiplied by a negative equal to a positive? How do the properties of operations for fraction multiplication extend to rational numbers? (MA10-GR.7-S.1-GLE.2-IQ.1)

Key Knowledge and Skills: **My students will…**	*What students will know and be able to do are so closely linked in the concept-based discipline of mathematics. Therefore, in the mathematics samples what students should know and do are combined.*

- Describe situations in which opposite quantities combine to make 0. (MA10-GR.7-S.1-GLE.2-EO.a.i)
- Describe real-world situations in which opposite quantities combine to make 0
- Understand $p + q$ as the number located a distance $|q|$ from p, in the positive or negative direction depending on whether q is positive or negative (MA10-GR.7-S.1-GLE.2-EO.a.iii)
- Demonstrate p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative
- Show that a number and its opposite have a sum of 0 (are additive inverses) (MA10-GR.7-S.1-GLE.2-EO.a.iv)
- Show that a number and its opposite have a sum of 0 (are additive inverses)
- Understand subtraction of rational numbers as adding the additive inverse, $p – q = p + (–q)$ (MA10-GR.7-S.1-GLE.2-EO.a.vi)
  Demonstrate subtraction of rational numbers as adding the additive inverse, p – q = p + (–q)
- Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. (MA10-GR.7-S.1-GLE.2-EO.a.vii)
- Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts
- Apply properties of operations as strategies to add and subtract rational numbers. (MA10-GR.7-S.1-GLE.2-EO.a.viii)
- Explain the properties of operations
  - Additive inverse, multiplicative inverse, multiplicative property of equality, additive property of equality, associative, commutative, and distributive properties
  - Use properties of operations to add and subtract rational numbers

- Understand multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers (MA10-GR.7-S.1-GLE.2-EO.b.i)
- Apply properties of operations to multiply rational numbers, including fractions and complex fractions
- Understand integers can be divided, provided the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number; if p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$ (MA10-GR.7-S.1-GLE.2-EO.b.iii)
- Apply properties of operations to divide rational numbers, including fractions and complex fractions
- Interpret sums, products and quotients of rational numbers by describing real-world contexts (MA10-GR.7-S.1-GLE.2-EO.a.v, b.ii, b.iii)
- Interpret sums of positive and negative rational numbers by describing real-world contexts
- Use multiplication of rational numbers to solve real-world problems
- Apply properties of operations as strategies to multiply and divide rational numbers. (MA10-GR.7-S.1-GLE.2-EO.b.iii, b.iv)
- Explain the properties of operations
    - Additive inverse, multiplicative inverse, multiplicative property of equality, additive property of equality, associative, commutative, and distributive properties
- Use properties of operations to add and subtract rational numbers
- Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats (MA10-GR.7-S.1-GLE.2-EO.b.v)
- Convert a rational number to a decimal using long division
- Solve real-world and mathematical problems involving the four operations with rational numbers. (MA10-GR.7-S.1-GLE.2-EO.c)
- Solve real-world and mathematical problems involving the four operations with rational numbers, including fractions and complex fractions
- Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. (MA10-GR.7-S.2-GLE.2-EO.a)
- Manipulate or simplify forms of expressions to solve real-world and mathematical problems
- Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. (MA10-GR.7-S.2-GLE.2-EO.b)
- Apply properties of operations to simplify forms of expressions and solve mathematical problems
- Assess the reasonableness of answers using estimation strategies

Critical Language: includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline. EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: *"Mark Twain exposes the hypocrisy of slavery through the use of satire."*	
A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):	*I know every rational number written as a fraction has a decimal equivalent that either terminates or repeats.* *I know the distance between 3 and -5 is the same as the distance from -5 and 3, which is the absolute value difference.*
Academic Vocabulary:	Describe, show, apply, convert, solve, strategic, , distance, positive, negative, direction subtraction, fraction, multiplication, division,
Technical Vocabulary:	Sum, additive inverse, rational numbers, absolute value, difference, number line, decimal, equivalence, terminating decimal, repeating decimal, numerator, denominator, distributive property, signed numbers, products, quotients, integers, opposite quantities,