Marietta City Schools

2023–2024 District Unit Planner

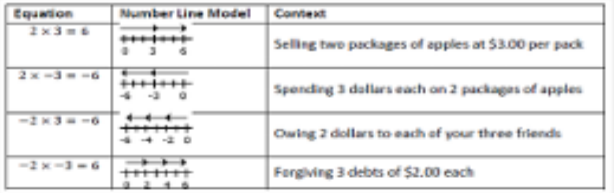
Grade 7 Honors Mathematics

Unit title	Unit 1: Making Relevant Connections within The Number System	**MYP year**	2	**Unit duration (hrs)**	*27 hours*

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): ***What will students learn?***

GA DoE Standards
Standards **Gifted Strand 2: Creative Thinking Skills:** Students will develop and utilize creative thinking through a variety of products and problem solving. **7.NR.1** Solve relevant, mathematical problems, including multi-step problems, involving the four operations with rational numbers and quantities in any form (integers, percentages, fractions, and decimal numbers). **7.MP:** Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals. **Concepts/Skills to support mastery of standards**

***NUMERICAL REASONING** – integers, percentages, fractions, decimal numbers*					
7.NR.1: Solve relevant, mathematical problems, including multi-step problems, involving the four operations with rational numbers and quantities in any form (integers, percentages, fractions, and decimal numbers).					
Expectations		**Evidence of Student Learning** **(not all inclusive; see Grade Level Overview for more details)**			
7.NR.1.1	Show that a number and its opposite have a sum of 0 (are additive inverses). Describe situations in which opposite quantities combine to make 0.	***Terminology*** • In the equation 3 + −3 = 0, 3 and −3 are additive inverses of each other.	***Example*** • Your bank account balance is − $25.00. You deposit $25.00 into your account. The net balance is $0.00.		
7.NR.1.2	Show and explain 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. Interpret sums of rational numbers by describing applicable situations.	***Strategies and Methods*** • Students should be able to add and subtract integers and other rational numbers presented within relevant, mathematical problems, using strategic thinking and a variety of tools.	***Example*** • 6 + (− 4) is 4 units to the left of 6 on a horizontal number line or 4 units down from 6 on a vertical number line.		
7.NR.1.3	Represent addition and subtraction with rational numbers on a horizontal or a vertical number line diagram to solve authentic problems.	***Strategies and Methods*** • Students should represent a variety of types of rational numbers on a number line diagram presented both horizontally and vertically.			
7.NR.1.4	Show and explain 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 contextual situations.	***Examples*** • Find the distance between a submarine submerged at a depth of $27\frac{3}{4}$ feet below sea level and an airplane flying at an altitude of $1262\frac{1}{2}$ feet above sea level. • $-\frac{1}{2}-(-2)$ is the same expression as $-\frac{1}{2}+-(-2)$, which is 2 units to the right of $-\frac{1}{2}$ on a horizontal number line or 2 units up from $-\frac{1}{2}$ on a vertical number line.			
7.NR.1.5	Apply properties of operations, including part-whole reasoning, as strategies to add and subtract rational numbers.	***Fundamentals*** • Students should be allowed to explore the signs of integers and what they really mean to discover integer rules.	***Strategies and Methods*** • Students should be able to use the Commutative and Associative properties to combine more than two rational numbers flexibly.	***Terminology*** • Part-whole reasoning refers to how numbers can be split into parts to add and subtract numbers more efficiently.	***Example*** • (–8) + 5 + (–2) may be solved as (–8) +(–2) + 5 to first make –10 by using the Commutative Property.

7.NR.1.6	Make sense of multiplication of rational numbers using realistic applications.	***Strategies and Methods*** • Student should have opportunities to use concepts of repeated addition and the meaning of a negative sign as the "opposite of," with both models and representations, leading to deriving the rules for multiplying signed numbers. • Models may include, but are not limited to, number lines and counters.	**Examples** • 4 * (–5) is 4 groups of (–5) and (–4) * (–3) is the opposite of 4 * (–3). • If yellow counters represent positive amounts and red counters represent negative amounts, you can model 3 * (–2) as three groups of two red counters. • David has a $0.00 balance in his bank account. He makes three withdrawals of $1.46 each. What is his bank account balance after the three withdrawals?
7.NR.1.7	Show and explain that integers can be divided, assuming the divisor is not zero, and every quotient of integers is a rational number.	***Fundamentals*** • If p and q are integers (q ≠ 0), then $-\left(\frac{p}{q}\right) = \frac{(-p)}{q} = \frac{p}{(-q)}$.	***Example*** • $-\left(\frac{20}{5}\right) = -4$ is the same as $\frac{(-20)}{5} = -4$ and $\frac{20}{(-5)} = -4$
7.NR.1.8	Represent the multiplication and division of integers using a variety of strategies and interpret products and quotients of rational numbers by describing them based on the relevant situation.	***Fundamentals*** • Students should be allowed to explore the signs of integers and what they really mean to discover integer rules. ***Strategies and Methods*** • Students can represent multiplication and division using number lines, counters, etc.	***Example*** • Create a model and realistic situations for each of the products. Write and model the family of equations related to 2 × 3 = 6.  Equation / Number Line Model / Context 2 × 3 = 6 — Selling two packages of apples at $3.00 per pack 2 × −3 = −6 — Spending 3 dollars each on 2 packages of apples −2 × 3 = −6 — Owing 2 dollars to each of your three friends −2 × −3 = 6 — Forgiving 3 debts of $2.00 each
7.NR.1.9	Apply properties of operations as strategies to solve multiplication and division problems involving rational numbers represented in an applicable scenario.	***Fundamentals*** • Students should be allowed to explore the signs of integers and what they really mean to discover integer rules. • Students should be able to reason about direction on a number line when representing multiplication and division using the tool.	***Strategies and Methods*** • Students should be able to use the Commutative and Associative properties to combine more than two rational numbers flexibly. ***Example*** • (– 8) * 2 * (–5) may be solved as (– 8) * (2*(–5)) to multiply by negative ten, using the Associative Property.
7.NR.1.10	Convert rational numbers between forms to include fractions, decimal numbers and percentages, using understanding of the part divided by the whole. Know that the decimal form of a rational number terminates in 0s or eventually repeats.	***Fundamentals*** • This is an extension of previous understanding from 6th grade of writing common fractions as decimal numbers and percentages.	***Age/Developmentally Appropriate*** • Students should know that every rational number can be written as the ratio of two integers, terminating decimal numbers, or repeating decimal numbers.

7.NR.1.11	Solve multi-step, contextual problems involving rational numbers, converting between forms as appropriate, and assessing the reasonableness of answers using mental computation and estimation strategies.	***Example*** • If Sara makes $25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or $2.50, for a new salary of $27.50.

Vocabulary

[K12 Mathematics Glossary]

Rational number
Opposite
Absolute value
Additive inverse
Zero pair
Integers
Repeating Decimal
Terminating Decimal
Negative Numbers
Positive Numbers
Long Division
Multiplicative Inverse
Rational Numbers

Key concept	Related concept(s)	Global context
Relationships The connections and associations between properties, objects, people and ideas.	**Model, Representation**	**Identity and Relationships**

Statement of inquiry

Mathematical models can help people represent real world relationships using operations with rational numbers.

Inquiry questions

Factual— What is a rational number? What is the difference between positive and negative numbers? What is absolute value? What is the additive inverse of a given number?

Conceptual— How can something be less than nothing? How can operations with positive and negative numbers be represented using models, such as number lines and counters?

Debatable - Is there one best method for solving operations with rational numbers?

MYP Objectives	**Assessment Tasks**	
*What specific MYP **objectives** will be addressed during this unit?*	***Relationship** between summative assessment task(s) and statement of inquiry:*	*List of common formative and summative assessments.*
Criterion A: Knowing and Understanding Criterion D: Investigating Patterns	Students will demonstrate how to use mathematical models to represent real world situations with rational numbers.	**Formative Assessment(s):** Unit 1 CFA **Summative Assessment(s):** Unit 1: Making Relevant Connections within the Number System Unit 1 MYP Assessment- Debits and Credits Teacher Guidance Student Reproductibles

Approaches to learning (ATL)

Category: Thinking
Cluster: CriticalThinking, Creative Thinking & Transfer
Skill Indicator: Apply skills and knowledge in unfamiliar situations.

Learning Experiences Add additional rows below as needed.		
Objective or Content	**Learning Experiences**	**Personalized Learning and Differentiation**
7.NR.1.1 Show that a number and its opposite have a sum of 0 (are additive inverse). Describe situations in which opposite quantities combine to make 0. **7.NR.1.2** Show and explain 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. Interpret sums of rational numbers by describing applicable situations. **7.NR.1.3** Represent addition with rational numbers on a horizontal or a vertical number line diagram to solve authentic problems. **7.NR.1.4** Show and explain 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 contextual situations. **7.NR.1.5** Apply properties of operations, including part-whole reasoning, as strategies to add and subtract rational numbers.	Balloon Challenge In this learning plan, students will use a concrete model to help them understand how to add and subtract integers. Teacher Guidance Student Handout	Individual Partner

7.NR.10 Convert rational numbers between forms to include fractions, decimal numbers and percents, using understanding of the part divided by the whole. Know that the decimal form of a rational number terminates in 0s or eventually repeats**.**	Repeater vs Terminator In this learning plan, students will convert fractions to decimals and determine if the decimal form of the rational number is terminating or repeating. Teacher Guidance Student Handout	Partners Small groups (3 – 4 students)

Content Resources

6-11 Savvas Correlation to 2021 standards

Intervention Tasks

Greedy Pig and Number Cards (7.NR.1.2, 1.3, 1.4, 1.5)

-Know the basic addition and subtraction facts.

Fair Shares (7.NR.1.5 and 1.10)

-Know simple fractions in everyday use.

Adding in Parts and Addition/Subtraction Strategies (7.NR.1.2, 1.3 ,1.4, 1.51.6, 1.7,1.8,1.9)

-Understand addition and subtraction of fractions, decimals, and integers.

-Record and interpret additive and simple multiplicative strategies, using a variety of strategies.

Other Resources

- **Savvas**
- **Desmos**
- **Hands-On Math**
- **GaDOE Unit 1 Curriculum Map**