



Marietta City Schools

District Unit Planner

Everything on the unit planner must be included on the unit curriculum approval statement.

Grade 7 Advanced Studies Mathematics

Unit title	Operations with Rational Numbers	MYP year	2	Unit duration (hrs)	31.5 Hours
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Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GSE Standards

Standards

MGSE7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

MGSE7.NS.1a 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. For example, your bank account balance is -\$25.00. You deposit \$25.00 into your account. The net balance is \$0.00.

MGSE7.NS.1b Understand $p + q$ as the number located a distance from p , in the positive or negative direction depending on whether q is positive or negative. Interpret sums of rational numbers by describing real world contexts.

MGSE7.NS.1c Understand 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.

MGSE7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers.

MGSE7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

MGSE7.NS.2a Understand that 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. Interpret products of rational numbers by describing real-world contexts

MGSE7.NS.2b Understand that integers can be divided, provided that 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 $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.

MGSE7.NS.2c Apply properties of operations as strategies to multiply and divide rational numbers.

MGSE7.NS.2d 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.

MGSE7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

Concepts/Skills to be Mastered by Students

- Apply and extend previous understandings of addition, subtraction, multiplication and division to include rational numbers.
- Represent addition and subtraction on a horizontal or vertical number line.

- Convert a rational number from a fraction to a decimal using division.
- Solve real-world and mathematical problems involving the four operations with rational numbers.
- Interpret quotients of rational numbers by describing real-world contexts.
- Understand integers can be divided (provided the divisor is not 0) and the dividend is a rational number.
- Interpret sums, differences, products and quotients of rational numbers in real world contexts.

Vocabulary

- Additive Inverse- Two numbers that have a sum of 0.
- Multiplicative Inverse- The multiplicative inverse of any number is another number that when multiplied by the original number gives the product as one.
- Absolute Value- The absolute value of a number a is the distance between a and zero on a number line. The absolute value of a is written as $|a|$.
- Integers- The set of positive whole numbers, their opposites, and 0.
- Long Division- A method for dividing numbers which breaks the division problem into multiple steps following a sequence.
- Natural Numbers- The counting numbers.
- Negative Numbers- Numbers less than zero.
- Opposite Numbers-Two numbers that are the same distance from 0 on a number line, but in opposite directions.
- Positive Numbers- Numbers greater than zero.
- Rational Numbers- A number that can be written in the form $\frac{a}{b}$ or $-\frac{a}{b}$, where a is a whole number and b is a positive whole number. The rational numbers include the integers.
- Repeating Decimal- A repeating decimal has a decimal expansion that repeats the same digit, or block of digits, without end.
- Terminating Decimal- A terminating decimal has a decimal expansion that terminates in 0.
- Zero Pair- A pair of numbers whose sum is zero.

Key concept	Related concept(s)	Global context
Relationships The connections and associations between properties, objects, people and ideas.	Model, Representation	Scientific and technical innovation
Statement of inquiry		
Mathematical models can help people represent real world relationships using operations with rational numbers		
Inquiry questions		
Factual — What are the steps to converting a rational number to a repeating or terminating decimal? 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 — What strategies are most useful in helping develop algorithms for adding, subtracting, multiplying, and dividing positive and negative 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.
<p>Criterion A: Knowing and Understanding</p> <p>Criterion D: Applying Mathematics in Real-life Contexts</p>	<p>Students will be expected to represent real world relationships using models that involve operations with rational numbers. Students will be expected to utilize properties of rational numbers to correctly model, solve and interpret solutions to real-world situations.</p>	<p>Formative Assessment(s):</p> <p>Unit 1 CFA- Standards NS.1a, 1c, 1d, 2c, 2d</p> <p>Summative Assessment(s):</p> <p>Unit 1 Summative Assessment- All standards in unit</p> <p>Unit 1 MYP Assessment- Debits and Credits (GaDOE Framework Task) NS. 1, NS. 1(a-d).</p>

Approaches to learning (ATL)

Category: Social
Cluster: Collaboration Skills
Skill Indicator: Give and receive meaningful feedback.

Category: Thinking
Cluster: Critical Thinking, 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
<p>MGSE7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers.</p>	<p><u>Zip, Zilch, Zero</u> <i>NCTM Illuminations</i> This activity provides an engaging and fun environment for students to increase their fluency with adding and subtracting integers. They will also have the opportunity to develop a strong understanding of additive inverses. Students will be expected to reason mathematically, make sense of problems, use tools strategically and persevere through mathematical</p>	<p>All information included by PLC in the differentiation box is the responsibility and ownership of the local school to review and approve per Board Policy IKB.</p> <p>Heterogeneous grouping will allow all students to be supported during this activity. The goal of this activity is to engage students in strengthening their fluency. For groups that are struggling, the teacher can be an active participant, modeling the thought</p>

	<p>problems. Students will make predictions, create strategies and evaluate the usefulness of their strategy while operating in a real-world situation. This activity would fall in the Assimilation quadrant on the Rigor and Relevance Framework. During this activity, teachers can formatively assess their mastery of standards NS. 1, NS.1a, NS. 1b, NS.1d.</p>	<p>process behind the activity.</p>
<p>MGSE7.NS.2a Understand that 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. Interpret products of rational numbers by describing real-world contexts</p>	<p><u>Why is a Negative Times a Negative Always a Positive?</u> <i>Illustrative Mathematics</i> The purpose of this task is for students to understand the reason it makes sense for the product of two negative numbers to be positive. Students will make sense and meaning of a common rule in mathematics. Students will complete the task prior to being taught the rule. This task requires students to analyze the behavior of multiplying two negative numbers together and generalize to create a conceptual understanding for themselves for this common mathematical operation. Students will apply this in all of their future Math courses, including Grade 7 Math. This activity would fall in the Assimilation quadrant on the Rigor and Relevance Framework.</p>	<p>Students who need scaffolding should be provided additional examples to work and reason through. This task relies on a solid foundation of the distributive property as well. Students struggling may need re-teaching on this topic. Students needing extension should be given the extension problems included in the task.</p>
Content Resources		
<p>Savvas- Topic 1 Illustrative Mathematics NCTM Illuminations GaDOE Frameworks</p> <p>Additional supports in this unit should include: Number Lines, Two colored chips, Algebra Tiles</p>		