



Marietta City Schools
2023–2024 District Unit Planner

Grade 6 Mathematics

Unit title	Unit 7: Rational Explorations: Numbers and their Opposites	MYP year	1	Unit duration (hrs)	<i>15 hours</i>
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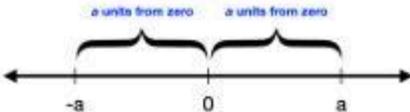
Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GA DoE Standards

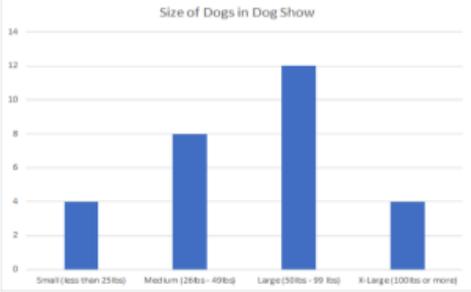
Standards

6.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.

6.NR.3: Solve a variety of problems involving whole numbers and their opposites; model rational numbers on a number line to describe problems presented in relevant, mathematical situations.

Expectations		Evidence of Student Learning (not all inclusive; see Grade Level Overview for more details)		
6.NR.3.1	Identify and compare integers and explain the meaning of zero based on multiple authentic situations.	<p>Relevance and Application</p> <ul style="list-style-type: none"> Students should be able to use numerical reasoning to explain that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, debits/credits, positive/negative electric charge). Students should be able to use positive and negative numbers to represent quantities in authentic situations and explain the meaning of zero based on each situation. Students should be able to interpret relevant, mathematical problems related to positive and negative numbers. 	<p>Example</p> <ul style="list-style-type: none"> Write $-5^{\circ}\text{C} > -9^{\circ}\text{C}$ to express the fact that -5°C is warmer than -9°C. 	
6.NR.3.2	Order and plot integers on a number line and use distance from zero to discover the connection between integers and their opposites.	<p>Strategies and Methods</p> <ul style="list-style-type: none"> Students should have opportunities to explore this concept using visual models to develop a deeper understanding. Number lines should be indicated both vertically and horizontally. 	<p>Example</p> <ul style="list-style-type: none"> Students should be able to recognize that $-a$ is the same distance from zero as a, and therefore, are opposites of each other. 	
6.NR.3.3	Recognize and explain that opposite signs of integers indicate locations on opposite sides of zero on the number line; recognize and explain that the opposite of the opposite of a number is the number itself.	<p>Fundamentals</p> <ul style="list-style-type: none"> Students should be able to explain that zero is its own opposite. Students should be able to explain that the sign of an integer represents its position relative to zero on a number line. Students should be able to show and explain why $-(-a) = a$. Which is read as, "The opposite of the opposite of a is the same as a." 		
6.NR.3.4	Write, interpret, and explain statements of order for rational numbers in authentic, mathematical situations. Compare rational	<p>Strategies and Methods</p> <ul style="list-style-type: none"> Students should be able to use numerical reasoning to interpret and explain the meaning of numerical statements of inequality as the 	<p>Terminology</p> <ul style="list-style-type: none"> Rational numbers are numbers that can be written as a fraction where the numerator and denominator are integers. 	<p>Examples</p> <ul style="list-style-type: none"> Write -3 degrees Celsius $>$ -7 degrees Celsius to express the fact that -3 degree Celsius is warmer than -7 degrees Celsius.

	numbers, including integers, using equality and inequality symbols.	<p>relative position of two integers positioned on a number line.</p> <ul style="list-style-type: none"> Students are introduced to rational numbers. Students should connect their understanding of fractions and integers to comprehend rational numbers as numbers that can be written as a fraction where the numerator and denominator are integers. 		<ul style="list-style-type: none"> Interpret $-8.3 > -12.3$ as a statement that -8.3 is located to the right of -12.3 on a number line oriented from left to right.
6.NR.3.5	Explain the absolute value of a rational number as its distance from zero on the number line; interpret absolute value as distance for a positive or negative quantity in a relevant situation.	<p>Terminology</p> <ul style="list-style-type: none"> Absolute value is a number's distance from zero (0) on a number line. 	<p>Fundamentals</p> <ul style="list-style-type: none"> Students should be introduced to the absolute value symbol with this learning objective, i.e., $- \frac{3}{4}$. Students should conclude through exploration that absolute value and distance are always expressed as a positive value. 	<p>Example</p> <p>For an account balance of -51.25 dollars, write $-51.25 = 51.25$ to describe the size of the debt in dollars.</p>
6.NR.3.6	Distinguish comparisons of absolute value from statements about order.	<p>Example</p> <ul style="list-style-type: none"> Recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars. 		

Expectations		Evidence of Student Learning (not all inclusive; see Grade Level Overview for more details)			
6.NR.2.1	Describe and interpret the center of the distribution by the equal share value (mean).	Age/Developmentally Appropriate <ul style="list-style-type: none"> The concept of mean should be explored visually and conceptually before introducing the formula. This is the beginning of the progression of the concept of measures of center and will continue to be developed in 6th grade. 		Strategies and Methods <ul style="list-style-type: none"> Students should be given the opportunity to use manipulatives such as: snap cubes, tiles, etc...to model equal share value. 	Example <ul style="list-style-type: none"> "If we combined all of the 5th grade students' candies and shared them equally with each student so everyone has the same number of candies." (This is the mean or equal share value.)
6.NR.2.2	Summarize categorical and quantitative (numerical) data sets in relation to the context: display the distributions of quantitative (numerical) data in plots on a number line, including dot plots, histograms, and box plots and display the distribution of categorical data using bar graphs.	Fundamentals <ul style="list-style-type: none"> Students have experience with displaying categorical data using bar graphs from elementary grades. In sixth grade, students are extending their understanding of analyzing categorical data 	Strategies and Methods <ul style="list-style-type: none"> As a result of an investigation, students should summarize categorical and quantitative (numerical) data sets in relation to the context. Students should be able to describe the 	Age/Developmentally Appropriate <ul style="list-style-type: none"> Sixth grade students should be able to create dot plots and box plots to analyze the results of an investigation. Sixth grade students should focus on describing and interpreting data displayed. Students should be able to identify that each quartile presented in a box plot 	Examples <ul style="list-style-type: none"> Categorical Example: 

displayed on histograms.

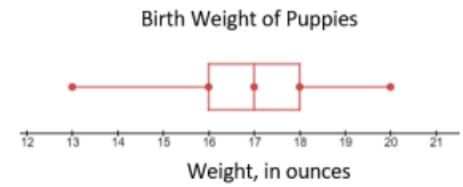
nature of the attribute under investigation, including how it was measured and its units of measurement.

represents 25% of the data set.

What could be the weight of the smallest dog? The largest?

- Quantitative (Numerical) Example:

Here are the birth weights, in ounces, of all the puppies born at a kennel in the past month.



What do you notice and wonder about the distribution of the puppy weights?

6.NR.2.3	Interpret numerical data to answer a statistical investigative question created. Describe the distribution of a quantitative (numerical) variable collected, including its center, variability, and overall shape.	<p>Fundamentals</p> <ul style="list-style-type: none"> • In sixth grade, students should explore the conceptual idea of MAD – not the formula. • Students should be able to determine the number of observations from a context or diagram. • Students should be able to describe the distribution of a quantitative (numerical) variable collected, including its center (median, mean), variability (interquartile range (IQR), mean absolute deviation (MAD), and range), and overall shape 	<p>Terminology</p> <ul style="list-style-type: none"> • Students should be able to apply their understanding of absolute value (rather than use operations on negative integers) in the context of MAD. 	<p>Strategies and Methods</p> <ul style="list-style-type: none"> • Students should explore conceptually the measures of center (mean, median) and variability (interquartile range and range) for a set of numerical data gathered from relevant, mathematical situations and use these measures to describe the shape of the data presented in various forms. 	<p>Example</p> <ul style="list-style-type: none"> • Arthur and Aaron are on the same 6th grade basketball team. Both players have scored an average of ten points over the past ten games. Here are the students' number of points scored during each of the last ten games. <p>Arthur: 9, 10, 10, 11, 11, 9, 10, 10, 10, 10 Aaron: 16, 18, 4, 3, 5, 13, 18, 3, 13, 7</p> <p>Which student is more consistent?</p> <p>Possible Student Response/Solution: Arthur is more consistent because his MAD is smaller than Aaron's</p>
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		<p>(symmetrical vs non-symmetrical).</p> <ul style="list-style-type: none"> • Data sets can be limited to no more than 10 data points when exploring the mean absolute deviation. • Students should be able to describe the nature of the attribute under investigation, including how it was measured and its units of measurement. 			MAD; Arthur has less variability than Aaron.
6.NR.2.4	Design simple experiments and collect data. Use data gathered from realistic scenarios and simulations to determine quantitative measures of center (median and/or mean) and variability (interquartile range and range). Use these quantities to draw conclusions about the data, compare different numerical data sets, and make predictions.	<p>Fundamentals</p> <ul style="list-style-type: none"> • Students should be able to use quantitative measures of center and variability to draw conclusions about data sets and make predictions based on comparisons. • Students should be able to identify that each quartile represents 25% of the data set. 		<p>Strategies and Methods</p> <ul style="list-style-type: none"> • Students should apply understanding of the measures of center (mean, median) and variability (interquartile range and range) to determine quantitative measures of center and variability, draw conclusions about the data, compare different-numerical data sets and make predictions using data gathered from realistic scenarios and simulations. 	
6.NR.2.5	Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	<p>Fundamentals</p> <ul style="list-style-type: none"> • Students should understand the concept of outliers. 		<p>Strategies and Methods</p> <ul style="list-style-type: none"> • Students should be able to analyze the shape of a data distribution and determine which measure of center and variability best describes the data based on the shape of the data and the context in which the data was gathered. 	

6.NR.2.6	Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Create data displays using a	<p>Strategies and Methods</p> <ul style="list-style-type: none"> Students should be able to analyze the shape of a data distribution and determine the impact single data points have on the data set represented visually.
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Vocabulary: [K-12 Mathematics Glossary](#)

Absolute Value	Negative Numbers	Distance	Opposite	Inequality	Positive Numbers
Integers	Rational Number	Magnitude	Sign		

Key concept	Related concept(s)	Global context
Relationships	Equivalence, Generalization	Identities and Relationships

Statement of inquiry

Modeling using a logical process helps us to understand the world

Inquiry questions

Factual—How are number lines and the coordinate plane different? What are opposites? What is absolute value? Where do I place positive and negative rational numbers on the number line? What are opposites, and how are opposites shown on a number line?

Conceptual—When are negative numbers used and why are they important? Why is it useful for me to know the absolute value of a number? When is graphing on the coordinate plane helpful? How do I use positive and negative numbers in everyday life? How do I use positive and negative numbers to represent quantities in real-world contexts? How do statements of inequality help me place numbers on a number line? How can I use coordinates to find the distances between points? How can I use number lines to find the distances between points? How can I use absolute value to find the lengths of the sides of polygons on the coordinate plane? What do reflections and symmetry have in common? How is absolute value and order different?

Debatable—Does a negative number always represent a negative situation?

MYP Objectives	Assessment Tasks	
<i>What specific MYP objectives will be addressed during this unit?</i>	Relationship between summative assessment task(s) and statement of inquiry:	<i>List of common formative and summative assessments.</i>
Criteria C (Communication) Criteria D (Applying Math to real-world context)	Students will understand and recognize positive and negative numbers on a number line and coordinate grid. Students will understand statements of inequality, absolute value, and real world mathematical problems.	<u>Formative Assessment(s):</u> Rational Explorations CFA <u>Summative Assessment(s):</u> MYP- Latin America Tour Rational Explorations and Graphing Rational Numbers Test
Approaches to learning (ATL)		
Category: Social Cluster: Collaboration Skills Skill Indicator: Give and receive meaningful feedback. Category: Communication Cluster: Communication Skill Indicator: Organize and depict information logically		

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
<p>6.NR.3.1 Identify and compare integers and explain the meaning of zero based on multiple authentic situations.</p> <p>6.NR.3.2 Order and plot integers on a number line and use distance from zero to discover the connection between integers and their opposites.</p> <p>6.NR.3.3 Recognize and explain that opposite signs of integers indicate locations on opposite sides of zero on the number line; recognize and explain that the opposite of the opposite of a number is the number itself.</p>	<p>Mid Topic Performance Task pg. 84 Savvas Resource</p>	<p>Teachers can provide scaffolded questioning to groups needing more support. And gradually release students to complete the task. Number lines and grid paper can be used to help students find rational numbers.</p>

Content Resources

[6-11 Savvas Correlation to 2021 standards](#)

GaDoe Intervention Table of Tasks/Activities

Additional Resources

- Savvas
- Desmos
- Hands-On Math