

High School Number and Quantity

The Mathematics Curriculum Framework represents the commitment of the Hinsdale School District to the Common Core State Standards and the ideas of Grant Wiggins and Jay McTighe in their principles of *Understanding by Design*. The Mathematics Curriculum Revision Committee (2015-16) believes that this document provides the necessary framework for teachers to develop mathematical units and lessons based on best practices in curriculum, instruction and assessment.

The Common Core State Standards for Mathematics requires that students develop a conceptual understanding of key concepts, procedural skills and fluency and the ability to use their knowledge to solve real world problems. Teachers are expected to develop lessons that meet these requirements by using a variety of instructional techniques and resources to meet individual student needs.

More information about the Common Core State Standards can be found at:

www.corestandards.org

High School- Number and Quantity	
Standard N-RN: The Real Number System Extend the properties of rational exponents Use properties of rational and irrational numbers.	
21st Century Learning Expectations Hinsdale students will take responsibility for their own learning. Hinsdale students will demonstrate responsibility for their actions and choices. Hinsdale students will be able to solve problems.	
Enduring Understandings: Real numbers include irrational numbers. Quantities can be represented in many forms and the relationships between them are important.	
Learning Competencies	Essential Questions
<p><i>Students will be able to</i></p> <ul style="list-style-type: none"> • apply standard exponent properties to fractional exponents. • rewrite expressions involving radicals and rational exponents using the properties of exponents. • explain why numbers stay rational or irrational when using the four operations. 	<ul style="list-style-type: none"> • When is using radical or rational exponent notation appropriate or useful? • Why would numbers stay rational or irrational when applying the four operations?

High School- Number and Quantity	
Standard N-Q: Quantities Reason quantitatively and use units to solve problems.	
21st Century Learning Expectations Hinsdale students will take responsibility for their own learning. Hinsdale students will demonstrate responsibility for their actions and choices. Hinsdale students will be able to solve problems.	
Enduring Understandings: Units can aid in understanding a problem. Correct scale is important in creating and interpreting graphs.	
Learning Competencies	Essential Questions
<p><i>Students will be able to</i></p> <ul style="list-style-type: none"> • use units to solve and understand problems with varying complexity. • choose and interpret the scale and origin in graphs and data display. • choose and interpret units consistently in formulas. • pick the right unit of scale. • apply significant figures appropriately. 	<ul style="list-style-type: none"> • What effects can choosing the wrong unit have on solving real world problems? • How does misapplied scale contribute to misinterpreting data?

High School- Number and Quantity	
Standard N-CN: The Complex Number System Perform arithmetic operations with complex numbers Represent complex numbers and their operations on the complex plane. Use complex numbers in polynomial identities and equations.	
21st Century Learning Expectations Hinsdale students will take responsibility for their own learning. Hinsdale students will demonstrate responsibility for their actions and choices. Hinsdale students will be able to solve problems.	
Enduring Understandings: A number system is a way of organizing numbers to accurately and consistently represent quantities and relationships. Properties of the real number system apply to complex numbers as well.	
Learning Competencies	Essential Questions
<p><i>Students will be able to</i></p> <ul style="list-style-type: none"> • explain that complex numbers are made up of real and imaginary numbers. • perform four standard operations with complex numbers and represent them graphically. • convert between rectangular and polar graphs. • perform calculations with complex numbers and complex answers. • extend polynomial identities to the complex numbers. • know the Fundamental Theorem of Algebra and show that it is true for quadratic polynomials. 	<ul style="list-style-type: none"> • What are the different ways to solve quadratic equations and when is each appropriate? • Why are complex numbers necessary? • How do numbers relate and compare to one another?

High School- Number and Quantity	
<p>Standard N-VM: Vector and Matrix Quantities Represent and model with vector quantities Perform operations on vectors. Perform operations on matrices and use matrices in applications.</p>	
<p>21st Century Learning Expectations Hinsdale students will take responsibility for their own learning. Hinsdale students will demonstrate responsibility for their actions and choices. Hinsdale students will be able to solve problems.</p>	
<p>Enduring Understandings: Matrix operations could be performed on matrices and help in solving systems of equations. Vectors and polar coordinates are useful in solving real world problems.</p>	
Learning Competencies	Essential Questions
<p><i>Students will be able to</i></p> <ul style="list-style-type: none"> • recognize vector quantities have magnitude and direction and use appropriate symbols when solving problems. • convert between magnitude and direction as well as component form. • add, subtract, multiply and divide vectors. • use matrices to represent and manipulate data. • add, subtract, and multiply matrices by each other and scalars. • understand that multiplication of matrices is not commutative. • understand when a matrix has an inverse. • understand the role of the zero and the identity matrices in addition and multiplication. • multiply vectors using matrix notation. • use 2x2 matrices for geometric transformations. 	<ul style="list-style-type: none"> • How do numbers relate and compare to one another? • Why are functions represented by polar equations? • Why are functions and relations represented by vectors?