Introduction

The State of New Jersey adopted the Common Core Standards for Mathematics in June of 2010 and requires implementation in grades 3-5 beginning in September of 2012. The Wandell School mathematics curriculum for grades K-5 incorporates the State of New Jersey's model curriculum for mathematics.

Common Core Standards for Mathematics:

The K-5 standards provide students with a solid foundation in whole numbers, addition, subtraction, multiplication, division, fractions and decimals—which help young students build the foundation to successfully apply more demanding math concepts and procedures, and move into applications.

The standards stress not only procedural skill but also conceptual understanding, to make sure students are learning and absorbing the critical information they need to succeed at higher levels.

These standards define what students should understand and be able to do in their study of mathematics. What does mathematical understanding look like? One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student's mathematical maturity, why a particular mathematical statement is true or where a mathematical rule comes from. There is a world of difference between a student who can summon a mnemonic device to expand a product such as $(a + b)(x + y)$ and a student who can explain where the mnemonic comes from. The student who can explain the rule understands the mathematics, and may have a better chance to succeed at a less familiar task such as expanding $(a + b + c)(x + y)$. Mathematical understanding and procedural skill are equally important, and both are assessable using mathematical tasks of sufficient richness.

All students must have the opportunity to learn and meet the same high standards if they are to access the knowledge and skills necessary in their post-school lives. The standards do provide clear signposts along the way to the goal of college and career readiness for all students.

National Governors Association Center for Best Practices, Council of Chief State School Officers. "Common Core State Standards - Mathematics." National Governors Association Center for Best Practices, Council of Chief State School Officers, Washington D.C., 2010. Web. 20 June 2012. <http://www.corestandards.org/the-standards/mathematics>.

Unit Overview

Content Area: Mathematics

Unit Title: Number and Operations in Base Ten

Target Course/Grade Level: Grade 5

Unit Summary

Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They finalize fluency with multi-digit addition, subtraction, multiplication, and division. They apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently and accurately.

(Source: http://www.corestandards.org/Math/Content/4/introduction/)

Primary interdisciplinary connections: Science, Social Studies, Physical Education, Writing

21st century themes:

- Critical Thinking/Problem Solving
- Communication
- Collaboration

Unit Rationale

To understand place value is to understand the structure and sequence of our base-ten number system. As students count, interpret the values of written and spoken numbers, decide which number is larger or smaller, and explore relationships among numbers, they are developing a picture of our number system. (Kliman, 2000)

Because operations with numbers such as tens and hundreds make for simple calculations, place value plays a critical role throughout the grades in the development of computation strategies. (Kliman, 2000)

Kliman/TERC, Marlene. "How Do Students Build an Understanding of Place Value in Investigations?" Welcome to Investigations. TERC, Jan. 2000. Web. 20 June 2012. <http://investigations.terc.edu/library/curric-math/qa-1ed/place_value.cfm>.

Learning Targets

Standards

- 5.NBT.A.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
- 5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
- 5.NBT.A.3a Read and write decimals to thousandths using base-ten numerals, number names, and

expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).

- 5.NBT.A.3b Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
- 5.NBT.A.4 Use place value understanding to round decimals to any place.
- 5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.
- 5.NBT.B.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
- 5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
- 5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*

Content Statements

- Understand the place value system.
- Read, write, and compare decimals to thousandths.
- Perform operations with multi-digit whole numbers and with decimals to hundredths.
- Write and interpret numerical expressions.

CPI #	Cumulative Progress Indicator (CPI) from NJDOE Model Curriculum
5.NBT.A.1	Describe the place value of numeral digits relative to both the place to the right and the place to the left (decimal to hundredths and whole numbers to billions).
5.NBT.A.2	Recognize and explain patterns of the number of zeros and the placement of the decimal point in a product or quotient when a number is multiplied or divided by powers of 10.
5.NBT.A.3a 5.NBT.A.3b	Compare decimals to thousandths based on the value of the digits in each place using the symbols >, =, < when presented as base ten numerals, number names, or expanded form.
5.NBT.A.4	Round a decimal to any place.
5.NBT.B.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
5.NBT.B.6	Calculate whole number quotients with 4-digit dividends and 2-digit divisors and explain answers with equations, rectangular arrays, and area models.
5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition, subtraction, multiplication, and division.
5.OA.A.2	Write numerical expressions when given a word problem or a scenario in words and use words to interpret numerical expressions.

Unit Essential Questions

Topic 1

- How are whole numbers and decimals written, compared, and ordered?

Topic 2

- How can sums and differences of decimals

Unit Enduring Understandings

- One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem.
- A quantity can be represented numerically in

be estimated?
- What are the standard procedures for adding and subtracting whole numbers and decimals?

Topic 3
- What are the standard procedures for estimating and multiplying whole numbers?

Topic 4
- What is the standard procedure for division and why does it work?

Topic 5
- What is the standard procedure for dividing with two-digit divisors?

Topic 6
- What are the standard procedures for estimating and finding products involving decimals?

Topic 7
- What are the standard procedures for estimating and finding quotients involving decimals?

various ways. Problem solving depends upon choosing wise ways.
- Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
- Computational fluency includes understanding the meaning and the appropriate use of numerical operations.
- The magnitude of numbers affects the outcome of operations on them.
- In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures.
- Context is critical when using estimation.
- The symbolic language of algebra is used to communicate and generalize patterns in mathematics.
- Algebraic representation can be used to generalize patterns and relationships.
- Mathematical models can be used to describe and quantify physical relationships.
- Physical models can be used to clarify mathematical relationships.
- Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole.

Unit Learning Targets
Students will ...
- Describe the place value of numeral digits relative to both the place to the right and the place to the left (decimal to hundredths and whole numbers to billions).
- Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
- Compare decimals to thousandths based on the value of the digits in each place using the symbols >, =, < when presented as base ten numerals, number names, or expanded form.
- Round a decimal to any place.
- Fluently multiply multi-digit whole numbers using the standard algorithm.
- Calculate whole number quotients with 4-digit dividends and 2-digit divisors and explain answers with equations, rectangular arrays, and area models.
- Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition, subtraction, multiplication, and division.
- Write numerical expressions when given a word problem or a scenario in words and use words to interpret numerical expressions.

Evidence of Learning

Summative Assessment (at the end of each topic)

Each topic has a summative test and a performance task.

Equipment needed: see individual topics

Teacher Resources: *enVision Math Common Core: Realize Edition.* 2015

Formative Assessments

- teacher observation
- homework
- "Review What You Know"
- "Independent Practice"
- Topic performance task

Topics

Topic	Timeframe
Topic 1 *Place Value*	14 days
Topic 2 *Adding and Subtracting Decimals*	14 days
Topic 3 *Multiplying Whole Numbers*	14 days
Topic 4 *Dividing by 1-Digit Divisors*	14 days
Topic 5 *Dividing by 2-Digit Divisors*	14 days
Topic 6 *Multiplying Decimals*	14 days
Topic 7 *Dividing Decimals*	14 days

Teacher Notes:

This unit consists of seven topics from the *enVision Math* Common Core series with anywhere from 6 to 8 lessons per topic. These seven topics address the Number and Operations in Base Ten domain of the Common Core Standards for Mathematics for Grade 5 students. In addition, these seven topics address all eight of the Standards for Mathematical Practice.

Essential questions were taken directly from the textbook series used by the district, *enVision Math Common Core: Realize Edition.*

Enduring understandings were taken from *Overarching Understandings and Essential Questions (New Jersey)* at http://jaymctighe.com/resources/downloads/

Curriculum Development Resources

Click the links below to access additional resources used to design this unit:

NJDOE. "Model Curriculum: Mathematics (K-12) - Grade 5." Model Curriculum: Mathematics (K-12) - Grade 5. New Jersey Dept. of Education, n.d. Web. 27 June 2015. <http://www.state.nj.us/education/modelcurriculum/math/1.shtml>.

Charles, Randall. *enVision Math Common Core*. Realize ed. Grade 5. Upper Saddle River: Pearson Education, 2015. Print. enVision Math Common Core

Common Core Standards for Mathematics. http://www.corestandards.org/Math/

McConnell, Carolyn. *The Essential Questions Handbook*. New York: Scholastic, 2011. Print.

Topic 1	
Content Area: Mathematics	
Topic Title: Place Value	**Timeframe:** 14 days

Topic Components

21st Century Themes

	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy

21st Century Skills

	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration

Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing

Integration of Technology: Digital resources are part of this textbook series.

Equipment needed: base ten blocks, place value chart, tenths grid, hundredth grid

Vocabulary:

- equivalent decimal
- standard form
- expanded form
- word form

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Describe the place value of numeral digits relative to both the place to the right and the place to the left (decimal to hundredths and whole numbers to billions). • Compare decimals to thousandths based on the value of the digits in each place using the symbols >, =, < when presented as base ten numerals, number names, or expanded form.	1. Review What You Know! 2. Interactive Learning 3. Place Value Relationships 4. Tenths and Hundredths 5. Going Digital 6. Thousandths 7. Decimal Place Value 8. Comparing Decimals 9. Problem Solving: Look for a Pattern 10. Going Digital 11. Reteaching 12. Topic 1 Test 13. Performance Task	• Teacher observation • Independent practice • Topic test • Performance task

Differentiation • differentiated worksheets/activities for each lesson • leveled homework for each lesson • reteaching resources at the end of each lesson		
Resources Provided *enVision Math Common Core: Realize Edition* teacher's guides, workbooks, digital resources, manipulatives		

Topic 2												
Content Area: Mathematics												
Topic Title: Adding and Subtracting Decimals										**Timeframe:** 14 days		
Topic Components												
21st Century Themes												
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy			
21st Century Skills												
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration					
Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing												
Integration of Technology: Digital resources are part of this textbook series.												
Equipment needed: grid paper **Vocabulary:** • Commutative Property • Associative Property • compatible numbers • compensation • rounding												

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Round a decimal to any place. • Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition, subtraction, multiplication, and division.	1. Review What You Know! 2. Interactive Learning 3. Mental Math 4. Mixed Problem Solving 5. Rounding Decimals 6. Estimating Sums and Differences 7. Algebra Connections 8. Modeling Addition and Subtraction of Decimals 9. Going Digital 10. Adding Decimals 11. Subtracting Decimals 12. Problem Solving: Multiple-Step Problems 13. Going Digital 14. Reteaching 15. Topic 2 Test	• Teacher observation • Independent practice • Topic test • Performance task

	16. Performance Task	

Differentiation

- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Topic 3								
Content Area: Mathematics								
Topic Title: Multiplying Whole Numbers						**Timeframe:** 14 days		
Topic Components								
21st Century Themes								
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy
21st Century Skills								
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration	

Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing

Integration of Technology: Digital resources are part of this textbook series.

Equipment needed: grid paper

Vocabulary:

- Commutative Property of Multiplication
- Associative Property of Multiplication
- Identity Property of Multiplication
- Zero Property of Multiplication
- factors
- product
- multiple
- exponent
- base
- partial products

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Recognize and explain patterns of the number of zeros and the placement of the decimal point in a product or quotient when a number is multiplied or divided by powers of 10. • Use the standard algorithm to multiply 3-digit whole numbers by 1-digit whole numbers. • Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition, subtraction, multiplication, and division. • Write numerical expressions when given a word problem or a scenario in words and use words to interpret numerical expressions.	1. Review What You Know! 2. Interactive Learning 3. Multiplication Properties 4. Multiplying by Powers of 10 5. Multiplying 2-Digit Numbers by Multiples of 10 6. Multiplying 2-Digit by 2-Digit Numbers 7. Multiplying Greater Numbers 8. Problem Solving: Draw a Picture and Write an Equation 9. Reateaching 10. Topic 3 Test 11. Performance Task	• Teacher observation • Independent practice • Topic test • Performance task

Differentiation

- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Topic 4											
Content Area: Mathematics											
Topic Title: Dividing by 1-Digit Divisors								**Timeframe:** 14 days			
Topic Components											
21st Century Themes											
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy		
21st Century Skills											
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration				
Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing											
Integration of Technology: Digital resources are part of this textbook series.											
Equipment needed: problem solving recording sheet **Vocabulary:** • dividend • divisor • quotient											

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Calculate whole number quotients with 4-digit dividends and 2-digit divisors and explain answers with equations, rectangular arrays, and area models. • Write numerical expressions when given a word problem or a scenario in words and use words to interpret numerical expressions.	1. Review What You Know! 2. Interactive Learning 3. Dividing Multiples of 10 and 100 4. Estimating Quotients 5. Problem Solving: Reasonableness 6. Dividing by 1-Digit Divisors 7. Stop and Practice 8. Zeros in the Quotient 9. Going Digital 10. More Dividing by 1-Digit Divisors 11. Problem Solving: Draw a Picture and Write an Equation 12. Reteaching 13. Topic 4 Test	• Teacher observation • Independent practice • Topic test • Performance task

	14. Performance Task	

Differentiation

- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Topic 5									
Content Area: Mathematics									
Topic Title: Dividing by 2-Digit Divisors								**Timeframe:** 14 days	
Topic Components									
21st Century Themes									
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy
21st Century Skills									
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration		
Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing									
Integration of Technology: Digital resources are part of this textbook series.									
Equipment needed: grid paper **Vocabulary:** • no new vocabulary									

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students:	1. Review What You Know!	• Teacher observation

• Calculate whole number quotients with 4-digit dividends and 2-digit divisors and explain answers with equations, rectangular arrays, and area models.	2. Interactive Learning 3. Using Patterns to Divide 4. Estimating Quotients with 2-Digit Divisors 5. Connecting Models and Symbols 6. Dividing by Multiples of 10 7. 1-Digit Quotients 8. Algebra Connections 9. 2-Digit Quotients 10. Dividing with Greater Numbers 11. Problem Solving: Missing or Extra Information 12. Reteaching 13. Topic 5 Test 14. Performance Task	• Independent practice • Topic test • Performance task

Differentiation

- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Topic 6											
Content Area: Mathematics											
Topic Title: Multiplying Decimals								**Timeframe:** 14 days			
Topic Components											
21st Century Themes											
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy		
21st Century Skills											
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration				

Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing
Integration of Technology: Digital resources are part of this textbook series.
Equipment needed: grid paper **Vocabulary:** • no new vocabulary

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Explain the "ten times" or 1/10 relationships for place values in multi-digit numbers moving right or left across the places. • Recognize and explain patterns of the number of zeros and the placement of the decimal point in a product or quotient when a number is multiplied or divided by powers of 10. • Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition, subtraction, multiplication, and division.	1. Review What You Know! 2. Interactive Learning 3. Multiplying Decimals by 10, 100, or 1,000 4. Estimating the Product of a Decimal and a Whole Number 5. Number Sense: Decimal Multiplication 6. Models for Multiplying Decimals 7. Algebra Connections 8. Multiplying a Decimal by a Whole Number 9. Multiplying Two Decimals 10. Problem Solving: Multiple-Step Problems 11. Reteaching 12. Topic 6 Test 13. Performance Task	• Teacher observation • Independent practice • Topic test • Performance task

Differentiation • differentiated worksheets/activities for each lesson • leveled homework for each lesson • reteaching resources at the end of each lesson
Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Topic 7											
Content Area: Mathematics											
Topic Title: Dividing Decimals								**Timeframe:** 14 days			
Lesson Components											
21st Century Themes											
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy		
21st Century Skills											
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration				
Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing											
Integration of Technology: Digital resources are part of this textbook series.											
Equipment needed: grid paper **Vocabulary:** • no new vocabulary											

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Describe the place value of numeral digits relative to both the place to the right and the place to the left (decimal to hundredths and whole numbers to billions). • Recognize and explain patterns of the number of zeros and the placement of the decimal point in a product or quotient when a number is	1. Review What You Know! 2. Interactive Learning 3. Dividing Decimals by 10, 100 or 1,000 4. Estimating Decimal Quotients 5. Number Sense: Decimal Division 6. Dividing by a Whole Number 7. Dividing a Whole Number by a Decimal 8. Dividing a Decimal by a Decimal 9. Problem Solving: Multiple-Step Problems 10. Reteaching 11. Topic 7 Test 12. Performance Task	• Teacher observation • Independent practice • Topic test • Performance task

multiplied or divided by powers of 10. • Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition, subtraction, multiplication, and division.		

Differentiation

- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Unit Overview

Content Area: Mathematics

Unit Title: Operations and Algebraic Thinking

Target Course/Grade Level: Grade 5

Unit Summary

Students will write and find the value of numerical expressions, and will look for number patterns in data and create a model of the data on a line graph.

Primary interdisciplinary connections: Science, Social Studies, Physical Education, Writing

21st century themes:

- Critical Thinking/Problem Solving
- Communication
- Collaboration

Unit Rationale

Recognizing, analyzing and constructing patterns helps to build a "strong foundation of algebra readiness", and is central to both art and science. (McConnell, 2011)

A firm grounding in the big picture of how operations with numbers interrelate and how they are vital tools in life can help students build the positive attitudes that will help them become confident, efficient,

and effective problem-solvers (McConnell, 2011)

Algebraic thinking develops problem-solving skills. Students must analyze what they know and don't know about a problem, determine a method for finding solutions, and check results for accuracy. Algebra provides students with resources for dealing with real-world situations in a "systematic, analytic manner." (McConnell, 2011)

Learning Targets

Standards

- 5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
- 5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*
- 5.OA.B.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*

Content Statements

- Write and interpret numerical expressions.
- Analyze patterns and relationships.

CPI #	Cumulative Progress Indicator (CPI) from NJDOE Model Curriculum
5.OA.A.1	Evaluate numerical expressions with parentheses, brackets or braces.
5.OA.A.2	Write numerical expressions when given a word problem or a scenario in words and use words to interpret numerical expressions.
5.OA.B.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence.* Explain informally why this is so.

Unit Essential Questions

- How are the values of an algebraic expression and a numerical expression found?

Unit Enduring Understandings

- The symbolic language of algebra is used to communicate and generalize the patterns in mathematics.
- Algebraic representation can be used to generalize patterns and relationships.
- Patterns and relationships can be represented graphically, numerically, symbolically, or verbally.
- Mathematical models can be used to describe and

	quantify physical relationships. • Physical models can be used to clarify mathematical relationships. • Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole.

Unit Learning Targets
Students will ...

- Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence.* Explain informally why this is so.
- Write numerical expressions when given a word problem or a scenario in words and use words to interpret numerical expressions.
- Evaluate numerical expressions with parentheses, brackets or braces.

Evidence of Learning

Summative Assessment (at the end of each topic)
Each topic has a summative test and a performance task.

Equipment needed: see individual topics

Teacher Resources: *enVision Math Common Core: Realize Edition.* 2015

Formative Assessments

- teacher observation
- homework
- "Review What You Know"
- "Independent Practice"
- Topic performance task

Topics

Topic	Timeframe
Topic 8 *Numerical Expressions, Patterns, and Relationships*	14 days

Teacher Notes:
This unit consists of two topics from the *enVision Math* Common Core series with anywhere from 6 to 10 lessons per topic. These two topics address the Operations and Algebraic Thinking domain of the Common Core Standards for Mathematics for Grade 4 students. In addition, these two topics address all eight of the Standards for Mathematical Practice.

Essential questions were taken directly from the textbook series used by the district, *enVision Math Common Core: Realize Edition.*

Enduring understandings were taken from *Overarching Understandings and Essential Questions (New Jersey)* at http://jaymctighe.com/resources/downloads/

Curriculum Development Resources

Click the links below to access additional resources used to design this unit:

NJDOE. "Model Curriculum: Mathematics (K-12) - Grade 5." Model Curriculum: Mathematics (K-12) - Grade 5. New Jersey Dept. of Education, n.d. Web. 27 June 2015. <http://www.state.nj.us/education/modelcurriculum/math/1.shtml>.

Charles, Randall. *enVision Math Common Core*. Realize ed. Grade 5. Upper Saddle River: Pearson Education, 2015. Print. enVision Math Common Core

Common Core Standards for Mathematics. http://www.corestandards.org/Math/

McConnell, Carolyn. *The Essential Questions Handbook*. New York: Scholastic, 2011. Print.

Topic 8	
Content Area: Mathematics	
Topic Title: Numerical Expressions, Patterns, and Relationships	**Timeframe:** 14 days

Topic Components

21st Century Themes

	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy

21st Century Skills

	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration

Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing

Integration of Technology: Digital resources are part of this textbook series.

Equipment needed: none

Vocabulary:

- variable
- numerical expression
- order of operations
- sequence
- corresponding terms

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. Explain informally why this is so. • Write numerical expressions when given a word problem or a scenario in words and use words to interpret numerical expressions. • Evaluate numerical expressions with parentheses, brackets or braces.	1. Review What You Know! 2. Interactive Learning 3. Variables and Expressions 4. Order of Operations 5. Mixed Problem Solving 6. Evaluating Expressions 7. Addition and Subtraction Expressions 8. Multiplication and Division Expressions 9. Patterns: Extending Tables 10. Problem Solving: Use Reasoning 11. Reteaching 12. Topic 8 Test 13. Performance Task	• Teacher observation • Independent practice • Topic test • Performance task

Differentiation

- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Unit Overview
Content Area: Mathematics
Unit Title: Number and Operations - Fractions

Target Course/Grade Level: Grade 5

Unit Summary

Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)

Source: The introduction to the Common Core Standard for Mathematics. Retrieved from http://www.corestandards.org/Math/Content/5/introduction/

Primary interdisciplinary connections: Science, Social Studies, Physical Education, Writing

21st century themes:

- Critical Thinking/Problem Solving
- Communication
- Collaboration

Unit Rationale

Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)

Although students come to the topic of fractions with an understanding of what it means to share, fractions present difficulties for many students. Using their own experiences, students build conceptual knowledge of how numbers relate, how to divide a whole, how to manipulate fractions and how to "express and picture the same quantities in a variety of ways." (McConnell, 2011)

A firm grounding in the big picture of how operations with numbers interrelate and how they are vital tools in life can help students build the positive attitudes that will help them become confident, efficient, and effective problem-solvers (McConnell, 2011)

Learning Targets

Standards

- 5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*
- 5.NF.A.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*
- 5.NF.B.3 Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve

word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*

- 5.NF.B.4a Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)*
- 5.NF.B.4b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
- 5.NF.B.5a Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
- 5.NF.B.5b Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.
- 5.NF.B.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
- 5.NF.B.7a Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.*
- 5.NF.B.7b Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.*
- 5.NF.B.7c Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*

Content Statements

- Use equivalent fractions as a strategy to add and subtract fractions.
- Apply and extend previous understandings of multiplication and division.
- Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
- Interpret multiplication as scaling (resizing).
- Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

CPI #	Cumulative Progress Indicator (CPI) from NJDOE Model Curriculum

5.NF.A.1	Add and subtract fractions (including mixed numbers) with unlike denominators by replacing the given fractions with equivalent fractions having like denominators.
5.NF.A.2	Solve word problems involving adding or subtracting fractions including unlike denominators, and determine if the answer to the word problem is reasonable, using estimations with benchmark fractions.
5.NF.B.3	Interpret a fraction as a division of the numerator by the denominator; solve word problems where division of whole numbers leads to fractional or mixed number answers.
5.NF.B.4a	Multiply fractions by whole numbers and draw visual models or create story contexts. Interpret the product (a/b) x q as a parts of a whole partitioned into b equal parts added q times. In general, if q is a fraction c/d, then $(a/b) \times (c/d) = a(1/b) \times c(1/d) = ac \times (1/b)(1/d) = ac(1/bd) = ac/bd$.
5.NF.B.4b	Find the area of a rectangle with fractional side lengths by tiling unit squares and multiplying side lengths.
5.NF.B.5a 5.NF.B.5b	Explain how a product is related to the magnitude of the factors.
5.NF.B.6	Solve real world problems involving multiplication of fractions (including mixed numbers), using visual fraction models or equations to represent the problem.
5.NF.B.7a	Divide a unit fraction by a non-zero whole number and interpret by creating a story context or visual fraction model.
5.NF.B.7b	Divide a whole number by a unit fraction and interpret by creating a story context or visual fraction model.
5.NF.B.7c	Solve real world problems involving division of unit fractions by whole numbers or whole numbers by unit fractions.

Unit Essential Questions

Topic 9

- What does it mean to add and subtract fractions with unlike denominators?
- What is a standard procedure for adding and subtracting fractions with unlike denominators?

Topic 10

- What does it mean to add and subtract mixed numbers?
- What is a standard procedure for adding and subtracting mixed numbers?

Topic 11

- What are standard procedures for estimating and finding products and quotients of fractions and mixed numbers?

Unit Enduring Understandings

- One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem.
- A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways.
- Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
- Computational fluency includes understanding the meaning and the appropriate use of numerical operations.
- The magnitude of numbers affects the outcome of operations on them.
- In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures.
- Context is critical when using estimation.

Unit Learning Targets

Students will ...

- Add and subtract fractions (including mixed numbers) with unlike denominators by replacing the given fractions with equivalent fractions having like denominators
- Solve word problems involving adding or subtracting fractions including unlike denominators, and determine if the answer to the word problem is reasonable, using estimations with benchmark fractions.
- Interpret a fraction as a division of the numerator by the denominator; solve word problems where division of whole numbers leads to fractional or mixed number answers.
- Multiply fractions by whole numbers and draw visual models or create story contexts. Interpret the product ($\boldsymbol{a/b}$) x $\boldsymbol{q}$ as $\boldsymbol{a}$ parts of a whole partitioned into $\boldsymbol{b}$ equal parts added $\boldsymbol{q}$ times. In general, if $\boldsymbol{q}$ is a fraction $\boldsymbol{c/d}$, then $\boldsymbol{(a/b) \times (c/d) = a(1/b) \times c(1/d) = ac \times (1/b)(1/d) = ac(1/bd) = ac/bd}$
- Find the area of a rectangle with fractional side lengths by tiling unit squares and multiplying side lengths.
- Explain how a product is related to the magnitude of the factors.
- Solve real world problems involving multiplication of fractions (including mixed numbers), using visual fraction models or equations to represent the problem.
- Divide a unit fraction by a non-zero whole number and interpret by creating a story context or visual fraction model.
- Divide a whole number by a unit fraction and interpret by creating a story context or visual fraction model.
- Solve real world problems involving division of unit fractions by whole numbers or whole numbers by unit fractions.

Evidence of Learning

Summative Assessment (at the end of each topic)

Each topic has a summative test and a performance task.

Equipment needed: see individual topics

Teacher Resources: *enVision Math Common Core: Realize Edition.* 2015

Formative Assessments

- teacher observation
- homework
- "Review What You Know"
- "Independent Practice"
- Topic performance task

Topics

Topic	Timeframe
Topic 9 *Adding and Subtracting Fractions*	14 days
Topic 10 *Adding and Subtracting Mixed Numbers*	14 days
Topic 11 *Multiplying and Dividing Fractions and Mixed Numbers*	14 days

Teacher Notes:
This unit consists of three topics from the *enVision Math* Common Core series with anywhere from 6 to 12 lessons per topic. These three topics address the Number and Operation - Fractions domain of the Common Core Standards for Mathematics for Grade 5 students. In addition, these three topics address all eight of the Standards for Mathematical Practice.

Essential questions were taken directly from the textbook series used by the district, *enVision Math Common Core: Realize Edition.*

Enduring understandings were taken from *Overarching Understandings and Essential Questions (New Jersey)* at http://jaymctighe.com/resources/downloads/

Curriculum Development Resources
Click the links below to access additional resources used to design this unit:

NJDOE. "Model Curriculum: Mathematics (K-12) - Grade 5." Model Curriculum: Mathematics (K-12) - Grade 5. New Jersey Dept. of Education, n.d. Web. 27 June 2015. <http://www.state.nj.us/education/modelcurriculum/math/1.shtml>.

Charles, Randall. *enVision Math Common Core*. Realize ed. Grade 5. Upper Saddle River: Pearson Education, 2015. Print. enVision Math Common Core

Common Core Standards for Mathematics. http://www.corestandards.org/Math/

McConnell, Carolyn. *The Essential Questions Handbook*. New York: Scholastic, 2011. Print.

Topic 9									
Content Area: Mathematics									
Topic Title: Adding and Subtracting Fractions								**Timeframe:** 14 days	
Lesson Components									
21st Century Themes									
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy
21st Century Skills									
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration		
Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing									
Integration of Technology: Digital resources are part of this textbook series.									
Equipment needed: fraction strips, fraction tiles									

Vocabulary:
- benchmark fraction
- least common denominator (LCD)

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Add and subtract fractions (including mixed numbers) with unlike denominators by replacing the given fractions with equivalent fractions having like denominators. • Solve word problems involving adding or subtracting fractions including unlike denominators, and determine if the answer to the word problem is reasonable, using estimations with benchmark fractions.	1. Review What You Know! 2. Interactive Learning 3. Problem Solving: Writing to Explain 4. Estimating Sums and Differences of Fractions 5. Adding Fractions with Unlike Denominators 6. Subtracting Fractions with Unlike Denominators 7. More Adding and Subtracting Fractions 8. Algebra Connections 9. Solving Problems with Fractions 10. Problem Solving: Draw a Picture and Write an Equation 11. Algebra Connections 12. Reteaching 13. Topic 9 Test 14. Performance Task	• Teacher observation • Independent practice • Topic test • Performance task

Differentiation
- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Topic 10											
Content Area: Mathematics											
Topic Title: Adding and Subtracting Mixed Numbers									**Timeframe:** 14 days		
Lesson Components											
21st Century Themes											
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy		
21st Century Skills											
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration				
Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing											
Integration of Technology: Digital resources are part of this textbook series.											
Equipment needed: fraction strips or tiles **Vocabulary:** • mixed numbers											

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Solve word problems involving adding or subtracting fractions including unlike denominators, and determine if the answer to the word problem is reasonable, using estimations with benchmark fractions. • Add and subtract fractions (including mixed numbers) with unlike denominators by replacing the given fractions with equivalent fractions having like denominators.	1. Review What You Know! 2. Interactive Learning 3. Estimating Sums and Differences of Mixed Numbers 4. Modeling Addition and Subtraction of Mixed Numbers 5. Mixed Problem Solving 6. Adding Mixed Numbers 7. Subtracting Mixed Numbers 8. More Adding and Subtracting Mixed Numbers 9. Problem Solving: Draw a Picture and Write an Equation 10. Reteaching 11. Topic 10 Test 12. Performance Task	• Teacher observation • Independent practice • Topic test • Performance task

Differentiation

- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Topic 11									
Content Area: Mathematics									
Topic Title: Multiplying and Dividing Fractions and Mixed Numbers								**Timeframe:** 14 days	
Lesson Components									
21st Century Themes									
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy
21st Century Skills									
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration		
Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing									
Integration of Technology: Digital resources are part of this textbook series.									
Equipment needed: grid paper, fraction circles, fraction tiles, counters **Vocabulary:** • scaling (resizing) • reciprocals									

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Interpret a fraction as a division of the numerator by the denominator; solve word problems where division of whole numbers leads to fractional or mixed	1. Review What You Know! 2. Interactive Learning 3. Multiplying Fractions and Whole Numbers 4. Multiplication as Scaling 5. Mixed Problem Solving 6. Estimating Products 7. Multiplying Two Fractions 8. Stop and Practice	• Teacher observation • Independent practice • Topic test • Performance task

number answers. • Multiply fractions by whole numbers and draw visual models or create story contexts. Interpret the product (***a/b***) x ***q*** as ***a*** parts of a whole partitioned into ***b*** equal parts added ***q*** times. In general, if ***q*** is a fraction ***c/d***, then (***a/b***) ***x*** (***c/d***) = ***a***(***1/b***) × ***c***(***1/d***) = ***ac*** × (***1/b***)(***1/d***) = ***ac***(***1/bd***) = ***ac/bd***. • Find the area of a rectangle with fractional side lengths by tiling unit squares and multiplying side lengths. • Explain how a product is related to the magnitude of the factors. • Solve real world problems involving multiplication of fractions (including mixed numbers), using visual fraction models or equations to represent the problem. • Divide a unit fraction by a non-zero whole number and interpret by creating a story context or visual fraction model. • Divide a whole number by a unit fraction and interpret by creating a story context or visual fraction model. • Solve real world problems involving division of unit fractions by whole numbers or whole numbers by unit fractions.	9. Area Models 10. Multiplying Mixed Numbers 11. Problem Solving: Multiple-Step Problems 12. Fractions and Division 13. Fractions, Mixed Numbers, and Decimals as Quotients 14. Dividing Whole Numbers by Unit Fractions 15. Dividing Unit Fractions by Non-Zero Whole Numbers 16. Problem Solving: Draw a Picture and Write an Equation 17. Reteaching 18. Topic 11 Test 19. Performance Task	

Differentiation

- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Unit Overview

Content Area: Mathematics

Unit Title: Measurement and Data

Target Course/Grade Level: Grade 5

Unit Summary

Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real world and mathematical problems. (*Source: The introduction to the Common Core Standard for Mathematics. Retrieved from http://www.corestandards.org/Math/Content/5/introduction/)*

Students use line plots to record generated data in fractional terms use the line plots to answer questions about the data.

Primary interdisciplinary connections: Science, Social Studies, Physical Education, Writing

21st century themes:

- Critical Thinking/Problem Solving
- Communication
- Collaboration

Unit Rationale

Manipulating and displaying data requires students to apply their knowledge of "reasoning, modeling, working with patterns, precise calculating, problem solving, and communicating." Data and the resulting statistics help to explain and predict real-world events. (McConnell, 2011)

An accurate and consistent system of measurement is a foundation of our economy and necessary for

interaction with others around the globe. Systems of measurement facilitate communication in all aspects of life. (McConnell, 2011)

Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real world and mathematical problems. (Common Core Standards)

Learning Targets

Standards

- 5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
- 5.MD.B.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally*.
- 5.MD.C.3a A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.
- 5.MD.C.3b A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.
- 5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
- 5.MD.C.5a Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
- 5.MD.C.5b Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.
- 5.MD.C.5c Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.
- 5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Content Statements

- Convert like measurement units within a given measurement system.
- Represent and interpret data.
- Graph points on the coordinate plane to solve real-world and mathematical problems.
- Geometric measurement: understand concepts of volume.
    - Recognize volume as an attribute of solid figures and understand concepts of volume

measurement.
- Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

CPI #	Cumulative Progress Indicator (CPI) from NJDOE Model Curriculum
5.MD.A.1	Convert standard measurement units within the same system (e.g., centimeters to meters) to solve multi-step problems).
5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*
5.MD.C.3a 5.MD.C.4	Know a cube with a side length of 1 unit is called a "unit cube" and can be used to measure volume. Choose an appropriate cubic unit based on the attributes of the 3-dimensional figure you are measuring.
5.MD.C.3b 5.MD.C.4	Understand and measure volume by counting the total number of same size cubic units required to fill a figure without gaps or overlaps.
5.MD.C.5a	Show that the volume of a right rectangular prism found by counting all the unit cubes is the same as the formulas $\mathbf{V} = \boldsymbol{l} \times \boldsymbol{w} \times \boldsymbol{h}$ or $\mathbf{V} = \mathbf{B} \times \boldsymbol{h}$.
5.MD.C.5b	Explain how both volume formulas relate to counting the cubes in one layer and multiplying that value by the number of layers (height).
5.MD.C.5c	Find the volume of a composite solid figure composed of two non-overlapping right rectangular prisms.
5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Unit Essential Questions

Topic 12
- How can three-dimensional shapes be represented and analyzed?
- What does the volume of a rectangular prism mean, and how can it be found?

Topic 13
- What are customary measurement units and how are they related?
- What are metric units and how are they related?

Topic 14
- How can line plots be used to represent data and answer questions?
- How can numbers be used to describe certain data sets?

Unit Enduring Understandings
- Geometric properties can be used to construct geometric figures.
- Geometric relationships provide a means to make sense of a variety of phenomena.
- Everyday objects have a variety of attributes, each of which can be measured in many ways.
- What we measure affects how we measure it.
- Measurements can be used to describe, compare, and make sense of phenomena.
- The message conveyed by the data depends on how the data is collected, represented, and summarized.
- The results of a statistical investigation can be used to support or refute an argument.

Unit Learning Targets
Students will ...

- Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.
- Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
- Convert standard measurement units within the same system (e.g., centimeters to meters) to solve multi-step problems).
- Understand and measure volume by counting the total number of same size cubic units required to fill a figure without gaps or overlaps.
- Know a cube with a side length of 1 unit is called a "unit cube" and can be used to measure volume.
- Choose an appropriate cubic unit based on the attributes of the 3-dimensional figure being measured.
- Show that the volume of a right rectangular prism found by counting all the unit cubes is the same as the formulas $\mathbf{V} = \boldsymbol{l} \times \boldsymbol{w} \times \boldsymbol{h}$ or $\mathbf{V} = \mathbf{B} \times \boldsymbol{h}$.
- Explain how both volume formulas relate to counting the cubes in one layer and multiplying that value by the number of layers (height).
- Find the volume of a composite solid figure composed of two non-overlapping right rectangular prisms.
- Apply formulas to solve real world and mathematical problems involving volumes of right rectangular prisms and composites of same.

Evidence of Learning

Summative Assessment (at the end of each topic)
Each topic has a summative test and a performance task.

Equipment needed: see individual topics

Teacher Resources: *enVision Math Common Core: Realize Edition.* 2015

Formative Assessments

- teacher observation
- homework
- "Review What You Know"
- "Independent Practice"
- Topic performance task

Topics

Topic	Timeframe
Topic 12 *Volume of Solids*	14 days
Topic 13 *Units of Measure*	14 days
Topic 14 *Data*	14 days

Teacher Notes:
This unit consists of three topics from the *enVision Math* Common Core series with anywhere from 4 to 7 lessons per topic. These three topics address the Measurement and Data domain of the Common Core Standards for Mathematics for Grade 5 students. In addition, these three topics address all eight of the Standards for Mathematical Practice.

Essential questions were taken directly from the textbook series used by the district, *enVision Math*

Common Core: Realize Edition.

Enduring understandings were taken from *Overarching Understandings and Essential Questions (New Jersey)* at http://jaymctighe.com/resources/downloads/

Curriculum Development Resources

Click the links below to access additional resources used to design this unit:

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Charles, Randall. *enVision Math Common Core*. Realize ed. Grade 5. Upper Saddle River: Pearson Education, 2015. Print. enVision Math Common Core

Common Core Standards for Mathematics. http://www.corestandards.org/Math/

McConnell, Carolyn. *The Essential Questions Handbook*. New York: Scholastic, 2011. Print.

Topic 12									
Content Area: Mathematics									
Topic Title: Volume of Solids								**Timeframe:** X hours/days	
Lesson Components									
21st Century Themes									
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy
21st Century Skills									
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration		

Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing

Integration of Technology: Digital resources are part of this textbook series.

Equipment needed: cubes that can be stacked to create rectangular prisms, rectangular prisms in a variety of sizes

Vocabulary:

- volume
- cubic unit

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Understand and measure volume by counting the total number of same size cubic units required to fill a figure without gaps or overlaps. • Know a cube with a side length of 1 unit is called a "unit cube" and can be used to measure volume. Choose an appropriate cubic unit based on the attributes of the 3-dimensional figure you are measuring. • Show that the volume of a right rectangular prism found by counting all the unit cubes is the same as the formulas **V** = ***l*** × ***w*** × ***h*** or **V** = **B** × ***h***. • Explain how both volume formulas relate to counting the cubes in one layer and multiplying that value by the number of layers (height). • Find the volume of a composite solid figure composed of two non-overlapping right rectangular prisms. • Apply formulas to solve real world and mathematical problems involving volumes of right rectangular prisms and composites of same.	1. Review What You Know! 2. Interactive Learning 3. Models and Volume 4. Volume 5. Mixed Problems Solving 6. Combining Volumes 7. Problem Solving: Use Objects and Reasoning 8. Reteaching 9. Topic 12 Test 10. Performance Task	• Teacher observation • Independent practice • Topic test • Performance task

Differentiation • differentiated worksheets/activities for each lesson • leveled homework for each lesson • reteaching resources at the end of each lesson		
Resources Provided *enVision Math Common Core: Realize Edition* teacher's guides, workbooks, digital resources, manipulatives		

Topic 13									
Content Area: Mathematics									
Topic Title: Units of Measure							**Timeframe:** X hours/days		
Lesson Components									
21st Century Themes									
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy
21st Century Skills									
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration		
Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing									
Integration of Technology: Digital resources are part of this textbook series.									
Equipment needed: ruler, yardstick, containers of varying sizes **Vocabulary:** • no new vocabulary									

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Convert standard measurement units within the same system (e.g., centimeters to meters) to solve multi-	1. Review What You Know! 2. Interactive Learning 3. Converting Customary Units of Length 4. Converting Customary Units of Capacity 5. Converting Customary Units of Weight	• Teacher observation • Independent practice • Topic test • Performance task

step problems).	6. Converting Metric Units of Length 7. Converting Metric Units of Capacity 8. Converting Metric Units of Mass 9. Problem Solving: Multiple-Step Problems 10. Reteaching 11. Topic 13 Test 12. Performance Task	

Differentiation

- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Topic 14

Content Area: Mathematics

Topic Title: Data | **Timeframe:** X hours/days

Lesson Components

21st Century Themes

	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy

21st Century Skills

	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration

Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing

Integration of Technology: Digital resources are part of this textbook series.

Equipment needed: grid paper

Vocabulary:

- line plot
- outlier
- survey
- data
- sample
- frequency table

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. • Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	1. Review What You Know! 2. Interactive Learning 3. Line Plots 4. Data from Surveys 5. Making Line Plots 6. Measurement Data 7. Problem Solving: Writing to Explain 8. Reteaching 9. Topic 14 Test 10. Performance Task	• Teacher observation • Independent practice • Topic test • Performance task

Differentiation

- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Unit Overview
Content Area: Mathematics
Unit Title: Geometry
Target Course/Grade Level: Grade 5
Unit Summary In this unit students will learn to locate points on a coordinate plane and use their knowledge about coordinates to solve problems. Students will also study some two-dimensional figures and sort them into

different categories according to their side lengths, angles, and other properties.

Primary interdisciplinary connections: Science, Social Studies, Physical Education, Writing

21st century themes:

- Critical Thinking/Problem Solving
- Communication
- Collaboration

Unit Rationale

Geometric shapes are essential to many facets of our lives, from art to architecture. Learning the mathematical principles that are the basis for "creating, describing, classifying, and manipulating shapes can open up new world for students." (McConnell, 2011, pg 82).

Learning Targets

Standards

- 5.G.A.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).
- 5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
- 5.G.B.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*
- 5.G.B.4 Classify two-dimensional figures in a hierarchy based on properties.
- 5.OA.B.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so*.

Content Statements

- Graph points on the coordinate plane to solve real-world and mathematical problems.
- Classify two-dimensional figures into categories based on their properties.
- Analyze patterns and relationships.

CPI #	Cumulative Progress Indicator (CPI) from NJDOE Model Curriculum
5.G.A.1	Use a pair of perpendicular number lines (**axes**) to define a coordinate system, with the intersection of the lines (**origin**) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers (**coordinates**).
5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
5.G.B.3	Identify attributes of a two-dimensional shape based on attributes of the groups and categories in which the shape belongs.

5.G.B.4	Classify two- dimensional figures in a hierarchy based on properties.
5.OA.B.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence.* Explain informally why this is so.

Unit Essential Questions

Topic 15

- How can angles be measured and classified?
- How can polygons, triangles, and quadrilaterals be described, classified, and named?

Topic 16

- How are points graphed?
- How can we show the relationship between sequences on a graph?

Unit Enduring Understandings

- Geometric properties can be used to construct geometric figures.
- Geometric relationships provide a means to make sense of a variety of phenomena.
- Coordinate geometry can be used to represent and verify geometric/algebraic relationships.

Unit Learning Targets

Students will ...

- Use a pair of perpendicular number lines (**axes**) to define a coordinate system, with the intersection of the lines (**origin**) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers (**coordinates**).
- Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
- Identify attributes of a two-dimensional shape based on attributes of the groups and categories in which the shape belongs.
- Classify two- dimensional figures in a hierarchy based on properties.
- Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.

Evidence of Learning

Summative Assessment (at the end of each topic)

Each topic has a summative test and a performance task.

Equipment needed: see individual topics

Teacher Resources: *enVision Math Common Core: Realize Edition.* 2015

Formative Assessments

- teacher observation
- homework
- "Review What You Know"
- "Independent Practice"
- Topic performance task

Topics	
Topic	**Timeframe**
Topic 15 *Classifying Plane Figures*	14 days
Topic 16 *Coordinate Geometry*	14 days

Teacher Notes:

This unit consists of two topics from the *enVision Math* Common Core series with 5 to 6 lessons per topic. These two topics address the Geometry domain of the Common Core Standards for Mathematics for Grade 5 students. In addition, these two topics address all eight of the Standards for Mathematical Practice.

Essential questions were taken directly from the textbook series used by the district, *enVision Math Common Core: Realize Edition.*

Enduring understandings were taken from *Overarching Understandings and Essential Questions (New Jersey)* at http://jaymctighe.com/resources/downloads/

Curriculum Development Resources

Click the links below to access additional resources used to design this unit:

NJDOE. "Model Curriculum: Mathematics (K-12) - Grade 5." Model Curriculum: Mathematics (K-12) - Grade 5. New Jersey Dept. of Education, n.d. Web. 27 June 2015. <http://www.state.nj.us/education/modelcurriculum/math/1.shtml>.

Charles, Randall. *enVision Math Common Core*. Realize ed. Grade 5. Upper Saddle River: Pearson Education, 2015. Print. enVision Math Common Core

Common Core Standards for Mathematics. http://www.corestandards.org/Math/

McConnell, Carolyn. *The Essential Questions Handbook*. New York: Scholastic, 2011. Print.

Topic 15									
Content Area: Mathematics									
Topic Title: Classifying Plane Figures						**Timeframe:** 14 days			
Lesson Components									
21st Century Themes									
	Global Awareness	X	Financial, Economic, Business, and		Civic Literacy		Health Literacy		Environmental Literacy

			Entrepreneurial Literacy					

21st Century Skills

	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration

Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing

Integration of Technology: Digital resources are part of this textbook series.

Equipment needed: pattern blocks

Vocabulary:

- polygon
- regular polygon
- triangle
- quadrilateral
- pentagon
- hexagon
- octagon
- equilateral triangle
- isosceles triangle
- scalene triangle
- right triangle
- acute triangle
- obtuse triangle
- parallelogram
- trapezoid
- rectangle
- rhombus
- square
- generalization

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Identify attributes of a two-dimensional shape based on attributes of the groups and categories in which the shape belongs. • Classify two-dimensional figures in a hierarchy based on properties.	1. Review What You Know! 2. Interactive Learning 3. Polygons 4. Triangles 5. Attributes of Quadrilaterals 6. Special Quadrilaterals 7. Classifying Quadrilaterals 8. Problem Solving: Make and Test Generalizations 9. Reteaching 10. Topic 13 Test 11. Performance Task	• Teacher observation • Independent practice • Topic test • Performance task

Differentiation

- differentiated worksheets/activities for each lesson

- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

enVision Math Common Core: Realize Edition teacher's guides, workbooks, digital resources, manipulatives

Topic 16									
Content Area: Mathematics									
Topic Title: Coordinate Geometry						**Timeframe:** 14 days			
Lesson Components									
21st Century Themes									
	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy		Environmental Literacy
21st Century Skills									
	Creativity and Innovation	x	Critical Thinking and Problem Solving	x	Communication	x	Collaboration		
Interdisciplinary Connections: Social Studies, Science, Physical Education, Writing									
Integration of Technology: Digital resources are part of this textbook series.									

Equipment needed: grid paper

Vocabulary:

- coordinate grid
- x-axis
- y-axis
- origin
- ordered pair
- x-coordinate
- y-coordinate

Goals/Objectives	Topic Strategies	Formative Assessment Tasks
Students: • Use a pair of perpendicular number lines (**axes**) to define a	1. Review What You Know! 2. Interactive Learning 3. Ordered Pairs 4. Mixed Problem Solving	• Teacher observation • Independent practice • Topic test • Performance task

coordinate system, with the intersection of the lines (**origin**) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers (**coordinates**). • Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. • Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.	5. Patterns and Graphing 6. More Patterns and Graphing 7. Graphing Number Patterns 8. Problem Solving: Work Backward 9. Reteaching 10. Topic 16 Test 11. Performance Task	

Differentiation

- differentiated worksheets/activities for each lesson
- leveled homework for each lesson
- reteaching resources at the end of each lesson

Resources Provided

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LESSON REFLECTION

Reflect on the lesson you have developed and rate the degree to which the lesson ***Strongly, Moderately*** or ***Weakly*** meets the criteria below.

Lesson Activities:	**Strongly**	**Moderately**	**Weakly**
Are challenging and require higher order thinking and problem solving skills			
Allow for student choice			
Provide scaffolding for acquiring targeted knowledge/skills			
Integrate global perspectives			
Integrate 21st century skills			
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills			
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills			
Are varied to address different student learning styles and preferences			
Are differentiated based on student needs			
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process			
Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives			
Provide opportunities for student reflection and self-assessment			
Provide data to inform and adjust instruction to better meet the varying needs of learners			

Created for New Jersey school districts through a project of the New Jersey Department of Education, Office of Academic Standards, in partnership with the N.J Association for Supervision and Curriculum Development and the N.J. Principals and Supervisors Association.

Wandell School Math Curricula

Aligned to the 2014 Common Core Standards for Mathematics

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Content Area:	
Course Title:	**Grade Level:**

Unit Plan 1	**Pacing Guide**
Unit Plan 1	**Pacing Guide**
Unit Plan 3	**Pacing Guide**
Unit Plan 4	**Pacing Guide**
Unit Plan 5	**Pacing Guide**
Unit Plan 6	**Pacing Guide**

Date Created:
Board Approved on:

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