

Chambersburg Area School District Mathematic Curriculum
7th Grade Advanced Pre-Algebra

Grade 8 mathematics is about (1) formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations; (2) grasping the concept of a function and using functions to describe quantitative relationships; (3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean theorem..

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
 4. Model with mathematics.
 5. Use appropriate tools strategically.
 6. Attend to precision.
 7. Look for and make use of structure.
8. Look for and makes sense of regularity in repeated reasoning.

Unit of Study	Unit 1: Percent and Proportional Relationships (7th U4)	
Time Frame/Pacing	27 days	
Big Ideas	● Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations. ● Measurement attributes can be quantified and estimated using customary and non-customary units of measure	
Unit Essential Questions	● How are relationships represented mathematically? ● How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations? ● How precise do measurements and calculations need to be?	
PA Core Standards		PA Assessment Anchors
7.RP.A.1 = CC.2.1.7.D.1 7.RP.A.2 = CC.2.1.7.D.1 7.RP.A.3 = CC.2.1.7.D.1 7.EE.B.3 = CC.2.2.7.B.3 7.G.A.1 = CC.2.3.7.A.1		M07.A-R.1 M07.B-E.2 M07.C-G.2
PA Eligible Content	M07.A-R.1.1.4 Represent proportional relationships by equations. Example: If total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as $t = pn$. M07.A-R.1.1.6 Use proportional relationships to solve multi-step ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees,	

	percent increase and decrease. M07.D-S.3.2.2 Find the probability of a simple event, including the probability of a simple event not occurring. Example: What is the probability of not rolling a 1 on a number cube?	
Learning Objectives (Concepts Taught)	Module 4 covers ratios and proportions with a concentration on percent. Problems in this module include simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, and percent error. This module includes percent problems about populations, which prepare students for probability models about populations covered in the next module.	
Performance Objectives (Skills Demonstrated)	• Solve percent problems • Convert fractions, decimals and percents • Represent and solve multi-step percent scenarios using graphs and tables • Use complex fractions to represent non-whole number percents	
Key Vocabulary:	Absolute Error Percent Error	
Assessments	Mid-Module Assessment Task 7.RP.A.1, 7.RP.A.2, 7.RP.A.3, 7.EE.B.3, CC.2.1.7.D.1, CC.2.2.7.B.3 End-of-Module Assessment Task 7.RP.A.1, 7.RP.A.2, 7.RP.A.3, 7.EE.B.3, 7.G.A.1, CC.2.1.7.D.1, CC.2.2.7.B.3, CC.2.3.7.A.1	
Resources and Differentiation Tools	Module 4 - Topic A Finding the Whole Lesson 1: Percent Lesson 2: Part of a Whole as a Percent Lesson 3: Comparing Quantities with Percent Lesson 4: Percent Increase and Decrease Lesson 5: Finding One Hundred Percent Given Another Percent Lesson 6: Fluency with Percents Module 4 - Topic B Percent Problems Including More Than One Whole Lesson 7: Markup and Markdown Problems Lesson 8: Percent Error Problems Lesson 9: Problem Solving When the Percent Changes (2 days? formula?) Lesson 10: Simple Interest Lesson 11: Tax, Commissions, Fees, & Other Real-World % Applications(2 days) Module 4 - Topic C Scale Drawings Lesson 12: The Scale Factor as a Percent for a Scale Drawing (skip example 1?) Lesson 13: Changing Scales Lesson 14: Computing Actual Lengths from a Scale Drawing Lesson 15: Solving Area Problems Using Scale Drawings Module 4 - Topic D (optional) Counting Problems Involving Percents Lesson 18: Counting Problems ELL Mathematics Overlay for Listening and Reading in Grades 6-8 ELL Mathematics Overlay for Speaking and Writing in Grades 6-8 Additional Supplemental Resources Big Ideas Chapter 6 PTi3 Unit 5 Unit 8	
Authentic Examples (real-world tasks)	2018 Item Sampler #9, 12 Dan Meyers 3 Act Math Dueling Discounts	Estimation 180 3 Act Math Thick as a Brick Ferrari Ride

Visual Representations & Strategies	Coordinate Plane Double Number Line Geometric Figures Ratio Tables Tape Diagrams
Writing in Math	2018 Item Sampler #17
Higher Level DOK Tasks	How to Increase Cognitive Demand for Math Tasks

Unit of Study	Unit 2: Statistics and Probability (7th U5)	
Time Frame/Pacing	25 days	
Big Ideas	• Data can be modeled and used to make inferences. • Measurement attributes can be quantified and estimated using customary and non-customary units of measure.	
Unit Essential Questions	• How does the type of data influence the choice of display? • How can probability and data analysis be used to make predictions? • Why does “what” we measure influence “how” we measure?	
PA Core Standards		PA Assessment Anchors
7.SP.A.1 = CC.2.4.7.B.1 7.SP.A.2 = CC.2.4.7.B.1 7.SP.B.3 = CC.2.4.7.B.2 7.SP.B.4 = CC.2.4.7.B.2 7.SP.C.5 = CC.2.4.7.B.2 7.SP.C.6 = CC.2.4.7.B.3 7.SP.C.8 = CC.2.4.7.B.3		M07.D-S.1 M07.D-S.2 M07.D-S.3
PA Eligible Content	M07.D-S.1.1.1 Determine whether a sample is a random sample given a real-world situation.	
	M07.D-S.1.1.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Example 1: Estimate the mean word length in a book by randomly sampling words from the book. Example 2: Predict the winner of a school election based on randomly sampled survey data.	
	M07.D-S.2.1.1 Compare two numerical data distributions using measures of center and variability. Example 1: The mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team. This difference is equal to approximately twice the variability (mean absolute deviation) on either team. On a line plot, note the difference between the two distributions of heights. Example 2: Decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.	
	M07.D-S.3.1.1 Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible (i.e., a probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event).	

	M07.D-S.3.2.1 Determine the probability of a chance event given relative frequency. Predict the approximate relative frequency given the probability. Example: When rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times but probably not exactly 200 times. M07.D-S.3.2.2 Find the probability of a simple event, including the probability of a simple event not occurring. Example: What is the probability of not rolling a 1 on a number cube? M07.D-S.3.2.3 Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.										
Learning Objectives (Concepts Taught)	In Module 5, students learn to draw inferences about populations based on random samples. Through the study of chance processes, students learn to develop, use, and evaluate probability models.										
Performance Objectives (Skills Demonstrated)	• Interpret probability as likelihood of an event • Estimate probability using collected data, diagrams, and simulations • Draw informal inferences about a population using random sampling • Compare variability of two populations										
Key Vocabulary:	<table> <tr> <td>Probability</td><td>Relative Frequency</td></tr> <tr> <td>Experiment</td><td>Population</td></tr> <tr> <td>Simulation</td><td>Sample</td></tr> <tr> <td>Event</td><td>Random</td></tr> <tr> <td>Frequency</td><td></td></tr> </table>	Probability	Relative Frequency	Experiment	Population	Simulation	Sample	Event	Random	Frequency	
Probability	Relative Frequency										
Experiment	Population										
Simulation	Sample										
Event	Random										
Frequency											
Assessments	Mid-Module Assessment Task 7.SP.C.5, 7.SP.C.6, 7.SP.C.7, 7.SP.C.8, CC.2.4.7.B.2, CC.2.4.7.B.3 End-of-Module Assessment Task 7.SP.A.1, 7.SP.A.2, 7.SP.B.3, 7.SP.B.4, 7.SP.C.5, 7.SP.C.6, 7.SP.C.7, 7.SP.C.8, CC.2.4.7.B.1, CC.2.4.7.B.2, CC.2.4.7.B.3										
Resources and Differentiation Tools	Module 5 Topic A Calculating & Interpreting Probabilities Lesson 1 & 2: Chance Experiments & Estimating Probabilities by Collecting Data Lesson 3: Chance Experiments with Equally Likely Outcomes Lesson 4: Calculating Probabilities for Chance Experiments with Equally Likely Outcomes Lesson 5: Chance Experiments with Outcomes That Are Not Equally Likely (focus on complements) Lesson 6: Using Tree Diagrams to Represent a Sample Space and to Calculate Probabilities Lesson 7: Calculating Probabilities of Compound Events Module 5 - Topic C Random Sampling and Estimating Population Characteristics (choose most appropriate questions) Lesson 13: Populations, Samples, and Generalizing Sample-to-Population Lesson 14: Selecting a Sample Lesson 15: Random Sampling Lesson 16: Methods for Selecting a Random Sample Lesson 17: Sampling Variability Lesson 18: Sampling Variability and the Effect of Sample Size Lesson 19: Understanding Variability When Estimating a Population Proportion										

	Lesson 20: Estimating a Population Proportion Module 5 Topic D Comparing Populations Lessons 22: Using Sample Data to Compare the Means of Two or More Populations ELL Mathematics Overlay for Listening and Reading in Grades 6-8 ELL Mathematics Overlay for Speaking and Writing in Grades 6-8	
	Additional Supplemental Resources Big Ideas/Other Chapter 10 PTi3 Units 11, 12 & 13	
Authentic Examples (real-world tasks)	2018 Item Sampler #14, 15, 16 Dan Meyers 3 Act Math Yellow Starbursts	Estimation 180 3 Act Math Carnival of Probability
Visual Representations & Strategies	Dot Plots Histograms Desmos (graphing calculator)	
Writing in Math	End-of-Module Assessment, Question #1a, b, c	
Higher Level DOK Tasks	How to Increase Cognitive Demand for Math Tasks	

Unit of Study	Unit 3: Geometry (7th U6)	
Time Frame/Pacing	31 days	
Big Ideas	Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization.	
Unit Essential Questions	- How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems? - How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving? - How can geometric properties and theorems be used to describe, model, and analyze situations?	
PA Core Standards		PA Assessment Anchors
7.G.A.3 = CC.2.3.7.A.1 7.G.B.5 = CC.2.3.7.A.2 7.G.B.6 = CC.2.3.7.A.2		M07.C-G.1
PA Eligible Content	M07.C-G.1.1.2 Identify or describe the properties of all types of triangles based on angle and side measures. M07.C-G.1.1.3 Use and apply the triangle inequality theorem. M07.C-G.1.1.4 Describe the two-dimensional figures that result from slicing three-dimensional figures. Example: Describe plane sections of right rectangular prisms and right rectangular pyramids. M07.C-G.2.1.1 Identify and use properties of supplementary, complementary, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. M07.C-G.2.1.2 Identify and use properties of angles formed when two parallel lines are cut by a transversal (e.g., angles may include alternate interior, alternate exterior, vertical, corresponding). M07.C-G.2.2.2 Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. Formulas will be provided.	
Learning Objectives (Concepts Taught)	Students will be drawing and constructing geometrical figures in Module 6. They also revisit unknown angle, area, volume, and surface area problems, which now include problems involving percentages of areas or volumes.	
Performance Objectives (Skills Demonstrated)	- Solve for unknown angles - Use ruler, compass and protractor or construct geometric figures - Explore cross sections and slices of three-dimensional figures - Find volume, area and surface area	

Key Vocabulary:	Right Rectangular Pyramid Surface of a Pyramid Three Sides Condition Triangle Correspondence Triangles with Identical Measures	Two Angles and the Included Side Condition Two Angles and the Side Opposite a Given Angle Condition Two Sides and the Included Angle Condition
Assessments	Mid-Module Assessment Task 7.G.B.2, 7.G.A.5, CC.2.3.7.A.2 End-of-Module Assessment Task 7.G.A.2, 7.G.A.3, 7.G.B.5, 7.G.B.6, CC.2.3.7.A.1, CC.2.3.7.A.2	
Resources and Differentiation Tools	Module 6 Topic A Unknown Angles Lesson 1: Complementary and Supplementary Angles Lesson 2 - 4: Solving for Unknown Angles Using Equations 8th Grade Module 2 Topic C Congruence and Angle Relationships Lesson 12: Angles Associated with Parallel Lines Lesson 14: More on the Angles of a Triangle (extension?) Module 6 Topic B Constructing Triangles Lesson 11: Conditions on Measurements That Determine a Triangle Module 6 Topic C Slicing Solids Lesson 16: Slicing a Right Rectangular Prism with a Plane Lesson 17: Slicing a Right Rectangular Pyramid with a Plane Big Ideas 7.3 Triangles 7.3e Angles of Triangles Module 6 Topic D Problems Involving Area and Surface Area Lessons 23-24: Surface Area (Focus on Prisms) Module 6 Topic E Problems Involving Volume Lesson 26: Volume of Composite Three-Dimensional Objects ELL Mathematics Overlay for Listening and Reading in Grades 6-8 ELL Mathematics Overlay for Speaking and Writing in Grades 6-8 Additional Supplemental Resources TinkerCad Activity Big Ideas/Other Red Book Chapters 7 & 9 Blue Book Chapter 3 PTi3 7th Grade Units 9 & 10 8th Grade Unit 6	
Authentic Examples (real-world tasks)	Dan Meyers 3 Act Math Holes Pokemon Go Cheat Broken Falcon Radar Volcano Penny Circle Coffee Traveler Popcorn Picker Coin Carpet Pizza Doubler	Estimation 180 3 Act Math Tether Ball Toilet Paper Roll Fun with a Sticky File Cabinet 8th-Transversals, Tape, & Stickies
Visual Representations & Strategies	Triangle Inequality AngLeg Activity AngLegs Familiar Objects	Cross Sections Site Tinker Cad
Writing in Math	End-of-Module Assessment, Question #3a, b, and c	

Higher Level DOK Tasks	How to Increase Cognitive Demand for Math Tasks
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Unit of Study	Unit 4: Integer Exponents and Scientific Notation (8th U1)	
Time Frame/Pacing	20 days	
Big Ideas	- Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools. - Mathematical relationships among numbers can be represented, compared, and communicated. - Measurement attributes can be quantified and estimated using customary and non-customary units of measure.	
Unit Essential Questions	- What does it mean to estimate or analyze numerical quantities? - When is it appropriate to estimate versus calculate? - What makes a tool and/or strategy appropriate for a given task? - How is mathematics used to quantify, compare, represent, and model numbers? - In what ways are the mathematical attributes of objects or processes measured, calculated, and/or interpreted?	
PA Core Standards		PA Assessment Anchors
CC.2.2.8.B.1 8.EE.A.1 CC.2.2.8.B.1 8.EE.A.3 CC.2.2.8.B.1 8.EE.A.4		M08.B-E.1 A1.1.1.3.1
PA Eligible Content	M08.B-E.1.1.1: Apply one or more properties of integer exponents to generate equivalent numerical expressions without a calculator (with final answers expressed in exponential form with positive exponents). Properties will be provided. M08.B-E.1.1.3: Estimate very large or very small quantities by using numbers expressed in the form of a single digit times an integer power of 10, and express how many times larger or smaller one number is than another. M08.B-E.1.1.4: Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Express answers in scientific notation and choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology (e.g., interpret 4.7EE9 displayed on a calculator as 4.7×10^9).	
Learning Objectives (Concepts Taught)	Exponential Notation Multiply Numbers in Exponential Form Write Numbers in Exponential Form Raised to a Power Write Numbers Raised to the Zeroth Power Negative Exponents and the Laws of Exponents Proofs of Laws of Exponents Magnitude Estimate Quantities Scientific Notation	

	Operations with Numbers in Scientific Notation Efficacy of Scientific Notation Compare and Interpreting Scientific Notation Using Technology of Numbers Written in Scientific Notation
Performance Objectives (Skills Demonstrated)	• Exponential Notation • Multiply Numbers in Exponential Form • Write Numbers in Exponential Form Raised to a Power • Write Numbers Raised to the Zeroth Power • Negative Exponents and the Laws of Exponents • Proofs of Laws of Exponents • Magnitude • Estimate Quantities • Scientific Notation • Operations with Numbers in Scientific Notation • Efficacy of Scientific Notation Compare and Interpreting Scientific Notation Using Technology of Numbers Written in Scientific Notation
Key Vocabulary:	Order of Magnitude Scientific Notation Base, Exponent, Power Equivalent Fractions Expanded Form (of decimal numbers) Exponential Notation Integer Square and Cube (of a number) Whole Number
Assessments	Mid-Module Assessment Task End-of-Module Assessment Task
Resources and Differentiation Tools	PRIMARY RESOURCE: Eureka Module 1 Topic A Exponential Notation & Properties of Integer Exponents Lesson 1: Exponential Notation Lesson 2: Multiplication of Numbers in Exponential Form Lesson 3: Numbers in Exponential Form Raised to a Power Lesson 4: Numbers Raised to the Zeroth power Lesson 5: Negative Exponents & the Laws of Exponents Module 1 Topic B Magnitude & Scientific Notation Lesson 7: Magnitude Lesson 8: Estimating Quantities Lesson 9: Scientific Notation Lesson 10: Operations with Numbers in Scientific Notation Lesson 11: Efficacy of Scientific Notation Lesson 13: Comparison of Numbers Written in Scientific Notation and Interpreting Scientific Notation using Technology ELL Mathematics Overlay for Listening and Reading in Grades 6-8 ELL Mathematics Overlay for Speaking and Writing in Grades 6-8 Additional Supplemental Resources Big Ideas BLUE Chapter 10 PTi3 Unit 3 Cycles 1 & 2
Authentic Examples (real-world tasks)	018 Item Sampler #5 Estimation 180 3 Act Math Exponent Mistakes Part 1 Exponent Mistakes Part 2
Visual Representations & Strategies	Integer Exponents Scientific Calculator Video Clip
Writing in Math	Grade 8 Item Sampler - Use item #5 as an open response without multiple choice items
Higher Level DOK Tasks	How to Increase Cognitive Demand for Math Tasks

Unit of Study	Unit 5: The Concept of Congruence (8th U2)	
Time Frame/Pacing	25 days	
Big Ideas	- Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization. - Measurement attributes can be quantified and estimated using customary and non-customary units of measure.	
Unit Essential Questions	- How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems? - How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving? - How can geometric properties and theorems be used to describe, model, and analyze situations? - In what ways are the mathematical attributes of objects or processes measured, calculated, and/or interpreted?	
PA Core Standards		PA Assessment Anchors
CC.2.3.8.A.1 8.G.A.1 CC.2.3.8.A.1 8.G.A.2 CC.2.3.8.A.1 8.G.A.5 CC.2.3.8.A.1 8.G.B.6 CC.2.3.8.A.2 8.G.B.7		M08.C-G.3 M08.C-G.2 M08.C-G.1 G.1.2.1.1 G.1.2.1.4 G.2.2.1.1
PA Eligible Content	M08.C-G.1.1.1 Identify and apply properties of rotations, reflections, and translations. Example: Angle measures are preserved in rotations, reflections, and translations.	
	M08.C-G.1.1.2 Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them.	
	M08.C-G.1.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	
	M08.C-G.1.1.4 Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them.	
	M08.B-E.2.1.2 Use similar right triangles to show and explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane.	
	M08.C-G.3.1.1 Apply formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems. Formulas will be provided.	

Learning Objectives (Concepts Taught)	Understand congruence and similarity using physical models, transparencies, or geometry software.	
Performance Objectives (Skills Demonstrated)	• Define Translation and Three Basic Properties • Translating Lines • Define of Reflection and Basic Properties • Define of Rotation and Basic Properties • Rotations of 180 Degrees • Sequence Translations • Sequence Reflections and Translations • Sequence Rotations • Sequencing of Rigid Motions • Definition of Congruence and Some Basic Properties • Angles Associated with Parallel Lines • Angle Sum of a Triangle • Informal Proof of the Pythagorean Theorem • Distance on the Coordinate Plane	
Key Vocabulary:	Angle Preserving Basic Rigid Motion Between Congruence Congruent Direct Line Segment Distance Preserving Exterior Angle Reflection Rotation	Sequence (Composition) of Transformations Transformation Transversal Vector Area and perimeter Parallel and perpendicular lines Ray, line, line segment, angle supplementary, complementary, vertical and adjacent angles Triangle, quadrilateral
Assessments	Mid-Module Assessment Task End-of-Module Assessment Task	
Resources and Differentiation Tools	PRIMARY RESOURCES Big Ideas BLUE Chapter 2 Transformations Section 1: Congruent Figures Section 2: Translations Section 3: Reflections Section 4: Rotations Section 5: Similar Figures Section 7: Dilations Eureka Module 2 Topic A Definitions and Properties of the Basic Rigid Motions Lesson 1: Why Move Things Around? Lesson 2: Definition of Translation and Three Basic Properties Lesson 4: Definition of Reflection and Basic Properties Lesson 5: Definition of Rotation and Basic Properties Lesson 6: Rotations of 180 Degrees Module 2 Topic B Sequencing the Basic Rigid Motions Lesson 7: Sequencing Translations Lesson 8: Sequencing Reflections and Translations Lesson 9: Sequencing Rotations Lesson 10: Sequences of Rigid Motions Lesson 11: Definition of Congruence and Some Basic Properties Module 2 Topic D The Pythagorean Theorem Lesson 15: Informal Proof of the Pythagorean Theorem (optional) Lesson 16: Applications of the Pythagorean Theorem (optional) ELL Mathematics Overlay for Listening and Reading in Grades 6-8 ELL Mathematics Overlay for Speaking and Writing in Grades 6-8	

	Additional Supplemental Resources PTi3 Unit 5 Cycles 1 & 2
Authentic Examples (real-world tasks)	Drawing a Street Map- Eureka Lesson #1, p. 12 Teacher's Edition
Visual Representations & Strategies	Patty Paper or Transparencies Geometry Software Rigid Motions Video
Writing in Math	Eureka Module 2 Lesson 13 Problem Set #1; p. 154 in Teacher Edition; S.70 in Student Edition
Higher Level DOK Tasks	How to Increase Cognitive Demand for Math Tasks

Unit of Study	Unit 6: Similarity (8th U3)	
Time Frame/Pacing	25 days	
Big Ideas	- Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization. - Measurement attributes can be quantified and estimated using customary and non-customary units of measure.	
Unit Essential Questions	- How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems? - How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving? - How can geometric properties and theorems be used to describe, model, and analyze situations? - In what ways are the mathematical attributes of objects or processes measured, calculated, and/or interpreted?	
PA Core Standards		PA Assessment Anchors
CC.2.3.8.A.1 8.G.A.3 CC.2.3.8.A.1 8.G.A.4 CC.2.3.8.A.1 8.G.A.5 CC.2.3.8.A.2 8.G.B.6 CC.2.3.8.A.2 8.G.B.7		M08.C-G.3 M08.C-G.1 G.1.2.1.1 G.1.2.1.4 G.2.2.1.1 G.2.3.1.2
PA Eligible Content	M08.C-G.1.1.1 Identify and apply properties of rotations, reflections, and translations. Example: Angle measures are preserved in rotations, reflections, and translations.	
	M08.C-G.1.1.2 Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them.	
	M08.C-G.1.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	
	M08.C-G.1.1.4 Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them.	
	M08.C-G.3.1.1 Apply formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems. Formulas will be provided.	
Learning Objectives (Concepts Taught)	Understand congruence and similarity using physical models, transparencies, or geometry software. Understand and apply the Pythagorean Theorem.	

Performance Objectives (Skills Demonstrated)	In Module 3, students learn about dilation and similarity and apply that knowledge to a proof of the Pythagorean theorem based on the angle-angle criterion for similar triangles. The module begins with the definition of dilation, properties of dilations, and compositions of dilations.	
Key Vocabulary:	Average Speed Constant Speed Horizontal Line Linear Equation (description) Point-Slope Equation of a Line Slope of a Line in a Cartesian Plane Slope-Intercept Equation of a Line Solution to a System of Linear Equations (description) Standard Form of a Linear Equation System of Linear Equations Vertical Line	X-Intercept Y-Intercept Coefficient Equation Like Terms Linear Expression Solution Term Unit Rate Variable
Assessments	Mid-Module Assessment Task End-of-Module Assessment Task	
Resources and Differentiation Tools	Module 3 Topic A: Dilation Lesson 1: What Lies Behind “Same Shape”? Lesson 2: Properties of Dilations Lesson 4: Fundamental Theorem of Similarity (FTS) Lesson 6: Dilations on the Coordinate Plane Module 3 Topic B: Similar Figures Lesson 11: More About Similar Triangles Lesson 12: Modeling Using Similarity Module 3 Topic C The Pythagorean Theorem Lesson 13: Proof of the Pythagorean Theorem Lesson 14: The Converse of the Pythagorean Theorem ELL Mathematics Overlay for Listening and Reading in Grades 6-8 ELL Mathematics Overlay for Speaking and Writing in Grades 6-8	
	Additional Supplemental Resources PTi3 Unit 6 Cycle 2	
Authentic Examples (real-world tasks)	Example with Flagpoles- p. 165 example in Lesson #12	
Visual Representations & Strategies	Compass Patty Paper or Transparency Geometry Software	Ruler Protractor Pythagorean Theorem Video
Writing in Math	End-Of-Module Assessment Task #1a, b, c, d, e	
Higher Level DOK Tasks	How to Increase Cognitive Demand for Math Tasks	

Unit of Study	Unit 7: Linear Equations (8th U4)	
Time Frame/Pacing	40 Days	
Big Ideas	- Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations. - Mathematical relationships among numbers can be represented, compared, and communicated. - Patterns exhibit relationships that can be extended, described, and generalized.	
Unit Essential Questions	- How are relationships represented mathematically? - How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations? - How is mathematics used to quantify, compare, represent, and model numbers? - How can patterns be used to describe relationships in mathematical situations? - How can recognizing repetition or regularity assist in solving problems more efficiently?	
PA Core Standards		PA Assessment Anchors
CC.2.2.8.B.2 8.EE.B.5 CC.2.2.8.B.2 8.EE.B.6 CC.2.2.8.B.3 8.EE.C.7 CC.2.2.8.B.3 8.EE.C.8		M08.B-E.2 A1.2.1.2.2 M08.B-E.3 A1.1.2.1.1 A1.1.2.2.1 A1.1.2.2.2
PA Eligible Content	M08.B-E.2.1.1 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. Example: Compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. M08.B-E.2.1.2 Use similar right triangles to show and explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane. M08.B-E.2.1.3 Derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b. M08.B-E.3.1.1 Write and identify linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). M08.B-E.3.1.2 Solve linear equations that have rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. M08.B-E.3.1.3 Interpret solutions to a system of two linear equations in two variables as points of intersection of their graphs because points of intersection satisfy both equations simultaneously.	

	M08.B-E.3.1.4 Solve systems of two linear equations in two variables algebraically and estimate solutions by graphing the equations. Solve simple cases by inspection. Example: $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6. M08.B-E.3.1.5 Solve real-world and mathematical problems leading to two linear equations in two variables. Example: Given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.	
Learning Objectives (Concepts Taught)	Understand the connections between proportional relationships, lines, and linear equations. Analyze and solve linear equations and pairs of simultaneous linear equations.	
Performance Objectives (Skills Demonstrated)	• Write Linear Expressions Using Symbols • Linear and Nonlinear Expressions in x • Linear Equations in x • Solve a Linear Equation • Classify a Solution • Proportional Relationships • Constant Rate • Linear Equations in Two Variables • Graph a Linear Equation in Two Variables • Graph a Linear Equation—Horizontal and Vertical Lines • Computation of & Rules for the Slope of a Non-Vertical Line • Introduction to Simultaneous Equations • Geometric Interpretation of the Solutions of a Linear System • Characterization of Parallel Lines • Nature of Solutions of a System of Linear Equations • Conversion Between Celsius and Fahrenheit • Pythagorean Theorem (8.EE.C.8, 8.G.B.7) • System of Equations Leading to Pythagorean Theorem	
Key Vocabulary:	Average Speed Constant Speed Horizontal Line Linear Equation (description) Point-Slope Equation of a Line Slope of a Line in a Cartesian Plane Slope-Intercept Equation of a Line Solution to a System of Linear Equations (description) Standard Form of a Linear Equation System of Linear Equations Vertical Line	X-Intercept Y-Intercept Coefficient Equation Like Terms Linear Expression Solution Term Unit Rate Variable
Assessments	Mid-Module Assessment Task End-of-Module Assessment Task	
Resources and Differentiation Tools	PRIMARY RESOURCE: Eureka Module 4 Topic A Writing and Solving Linear Equations Lesson 1: Writing Equations Using Symbols Lesson 2: Linear and Nonlinear Expressions in x Lesson 3: Linear Equations in x Lesson 4: Solving a Linear Equation Lesson 5: Writing and Solving Linear Equations Lesson 6: Solutions of a Linear Equation Lesson 7: Classification of Solutions Lesson 8: Linear Equations in Disguise (optional) Module 4 Topic B Linear Equations in Two Variables and Their Graphs Lesson 10: A Critical Look at Proportional Relationships	

	Lesson 11: Constant Rate Lesson 12: Linear Equations in Two Variables Lesson 13: The Graph of a Linear Equation in Two Variables Lesson 14: The Graph of a Linear Equation Horizontal & Vertical Lines Module 4 Topic C Slope and Equations of Lines Lesson 15: The Slope of a Non-Vertical Line Lesson 16: The Computation of the Slope of a Non-Vertical Line Lesson 17: The Line Joining Two Distinct Points of the Graph $y=mx+b$ has Slope m Lesson 18: There is Only One Line Passing Through a Given Point with a Given Slope Lesson 19: The Graph of a Linear Equation in Two Variables Is a Line (skip ex. 1) Lesson 20: Every Line Is a Graph of a Linear Equation (focus on slope-intercept form) Lesson 22: Constant Rates Revisited Module 4 Topic D Systems of Linear Equations and the Solutions Lesson 24: Introduction to Simultaneous Equations Lesson 25: Geometric Interpretation of the Solutions of a Linear system Lesson 26: Characterization of Parallel Lines Lesson 27: Nature of Solutions of a System of Linear Equations (focus on substitution) Lesson 29: Word Problems (focus on solving with substitution) ELL Mathematics Overlay for Listening and Reading in Grades 6-8 ELL Mathematics Overlay for Speaking and Writing in Grades 6-8 Additional Supplemental Resources Big Ideas Chapter 4 Sections 2, 3, 6 PTi3 Unit 7 Cycle 1 Unit 7 Cycle Unit 8 Cycle 1 Unit 13 Cycle 1 Unit 13 Cycle 2
Authentic Examples (real-world tasks)	2018 Item Sampler #7, 10 Eureka Lesson #1 Example Problem Discussion Problem, p. 484 Eureka Teacher's Edition Dan Meyers 3 Act Math Ditch Diggers Playing Catch Up Coin Counting Estimation 180 3 Act Math Zipline Basketball Shots
Visual Representations & Strategies	Desmos Graph Paper Straight Edge
Writing in Math	End-Of-Module Assessment Task #2a, b, c, d
Higher Level DOK Tasks	How to Increase Cognitive Demand for Math Tasks

Unit of Study	Unit 8: Examples of Functions from Geometry (8th U5)	
Time Frame/Pacing	15 Days	
Big Ideas	- Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations. - Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization. - Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions. - Patterns exhibit relationships that can be extended, described, and generalized.	
Unit Essential Questions	- How are relationships represented mathematically? - How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations? - How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems? - How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving? - How can geometric properties and theorems be used to describe, model, and analyze situations? - How can data be organized and represented to provide insight into the relationship between quantities? - How can patterns be used to describe relationships in mathematical situations? - How can recognizing repetition or regularity assist in solving problems more efficiently?	
PA Core Standards		PA Assessment Anchors
CC.2.2.8.C.1 8.F.A.1 CC.2.2.8.C.1 8.F.A.2 CC.2.2.8.C.1 8.F.A.3 CC.2.3.8.A.3 8.G.C.9		M08.B-F.1 A1.1.2.1.1 A1.2.1.1.2 A1.2.1.2.1 A1.2.1.2.2 M08.C-G.2 G.2.1.1.1 G.2.1.2.1
PA Eligible Content	M08.B-F.1.1.1 Determine whether a relation is a function. M08.B-F.1.1.2 Compare properties of two functions, each represented in a different way (i.e., algebraically, graphically, numerically in tables, or by verbal descriptions). Example: Given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. M08.B-F.1.1.3 Interpret the equation $y = mx + b$ as defining a linear function whose graph is a straight line; give examples of functions that are not linear. M08.C-G.2.1.1 Apply the converse of the Pythagorean theorem to show a triangle is a right triangle. M08.C-G.2.1.2 Apply the Pythagorean theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (Figures provided for problems in three dimensions will be consistent with Eligible Content in grade 8 and below.)	

	M08.C-G.2.1.3 Apply the Pythagorean theorem to find the distance between two points in a coordinate system.																
Learning Objectives (Concepts Taught)	Define, evaluate, and compare functions *Linear and non-linear functions are compared in this module using linear equations and area/volume formulas as examples Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres. *Solutions that introduce irrational numbers are not introduced until Module 7																
Performance Objectives (Skills Demonstrated)	• Definition of a Function • Linear Functions and Proportionality • Graph Functions and Equations • Graph Linear Functions and Rate of Change • Compare Linear Functions and Graphs • Graph Simple Nonlinear Functions • Functions from Geometry • Find Volumes of Familiar Solids—Cones and Cylinders • Find Volume of a Sphere																
Key Vocabulary:	<table border="0"> <tr> <td>Cone</td><td>Sphere</td></tr> <tr> <td>Cylinder</td><td>Area</td></tr> <tr> <td>Equation Form of Linear Function (description)</td><td>Linear Equation</td></tr> <tr> <td>Function (description)</td><td>Nonlinear Equation</td></tr> <tr> <td>Graph of Linear Function</td><td>Rate of Change</td></tr> <tr> <td>Lateral Edge and Face of a Prism</td><td>Solids</td></tr> <tr> <td>Linear Function (description)</td><td>Volume</td></tr> <tr> <td>Solid Sphere or Ball</td><td></td></tr> </table>	Cone	Sphere	Cylinder	Area	Equation Form of Linear Function (description)	Linear Equation	Function (description)	Nonlinear Equation	Graph of Linear Function	Rate of Change	Lateral Edge and Face of a Prism	Solids	Linear Function (description)	Volume	Solid Sphere or Ball	
Cone	Sphere																
Cylinder	Area																
Equation Form of Linear Function (description)	Linear Equation																
Function (description)	Nonlinear Equation																
Graph of Linear Function	Rate of Change																
Lateral Edge and Face of a Prism	Solids																
Linear Function (description)	Volume																
Solid Sphere or Ball																	
Assessments	Mid-Module Assessment Task End-of-Module Assessment Task																
Resources and Differentiation Tools	PRIMARY RESOURCE: Eureka Module 5 Topic A Functions Lesson 1: The Concept of a Function Lesson 2: Formal Definition of a Function Lesson 3: Linear Functions and Proportionality Lesson 4: More Examples of functions Lesson 5: Graphs of Functions and Equations Lesson 6: Graphs of Linear Functions and Rate of Change Lesson 7: Comparing Linear Functions and Graphs Lesson 8: Graphs of Simple Nonlinear Functions Module 5 Topic B Volume Lesson 9: Examples of Functions from Geometry Lesson 10: Volumes of Familiar Solids--Cones and Cylinders Lesson 11: Volume of a Sphere ELL Mathematics Overlay for Listening and Reading in Grades 6-8 ELL Mathematics Overlay for Speaking and Writing in Grades 6-8 Additional Supplemental Resources Big Ideas BLUE Chapter 6 Section 1 PTi3 Unit 12 Cycle 1																
Authentic Examples (real-world tasks)	Graham Fletchy 3 Act Math Fill'er Up Dan Meyer 3 Act Math 25 Billion Apps Joules Estimation 180 3 Act Math Trashketball																

Visual Representations & Strategies	3D Solids-Cones, Cylinders, Spheres
Writing in Math	End-Of-Module Assessment Problem #1: How Many Smartphones?
Higher Level DOK Tasks	How to Increase Cognitive Demand for Math Tasks

Unit of Study	Unit 9: Linear Functions (8th U6)	
Time Frame/Pacing	20 Days	
Big Ideas	- Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations. - Data can be modeled and used to make inferences. - Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization. - Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions. - Patterns exhibit relationships that can be extended, described, and generalized.	
Unit Essential Questions	- How are relationships represented mathematically? - How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations? - How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems? - How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving? - How does the type of data influence the choice of display? - How can probability and data analysis be used to make predictions? - How can geometric properties and theorems be used to describe, model, and analyze situations? - How can data be organized and represented to provide insight into the relationship between quantities? - How can patterns be used to describe relationships in mathematical situations? - How can recognizing repetition or regularity assist in solving problems more efficiently?	
PA Core Standards		PA Assessment Anchors
CC.2.2.8.C.2 8.FB.4 CC.2.2.8.C.2 8.F.B.5 CC.2.4.8.B.1 8.SP.A.1 CC.2.4.8.B.1 8.SP.A.2 CC.2.4.8.B.1 8.SP.A.3 CC.2.4.8.B.2 8.SP.A.4		M08.B-F.2 A1.1.2.1.3 A1.2.1.1.1 A1.2.1.2.2 A1.2.2.1.3 A1.2.2.1.4 M08.D-S.1 A1.2.2.2.1
PA Eligible Content	M08.B-F.2.1.1 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values. M08.B-F.2.1.2 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch or determine a graph that exhibits the qualitative features of a function that has been described verbally.	

	M08.D-S.1.1.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative correlation, linear association, and nonlinear association. M08.D-S.1.1.2 For scatter plots that suggest a linear association, identify a line of best fit by judging the closeness of the data points to the line. M08.D-S.1.1.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. Example: In a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height. M08.D-S.1.2.1 Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible associations between the two variables. Example: Given data on whether students have a curfew on school nights and whether they have assigned chores at home, is there evidence that those who have a curfew also tend to have chores?	
Learning Objectives (Concepts Taught)	Use functions to model relationships between quantities Investigate patterns of association in bivariate data. *Solutions that introduce irrational numbers are not introduced until Module 7	
Performance Objectives (Skills Demonstrated)	• Model Linear Relationships • Interpret Rate of Change and Initial Value, Representations of a Line, • Increasing and Decreasing Functions, Scatter Plots, Patterns in Scatter Plots • Informally Fitting a Line • Determine the Equation of a Line Fit to Data • Linear Models • Use Linear and Nonlinear Models in a Data Context • Summarize Bivariate Categorical Data in a Two-Way Table • Association Between Categorical Variables.	
Key Vocabulary:	Association (description) Bivariate Data Set (description) Column Relative Frequency Row Relative Frequency Scatterplot Two-way Frequency Table (description)	Variable (description) Categorical Variable Intercept or Initial Value Numerical Value Slope
Assessments	Mid-Module Assessment Task End-of-Module Assessment Task	
Resources and Differentiation Tools	Module 6 Topic A Linear Functions Lesson 1: Modeling Linear Relationships Lesson 2: Interpreting Rate of Change and Initial Value Lesson 3: Representations of a Line Lessons 4-5: Increasing and Decreasing Functions Module 6 Topics B Bivariate Numerical Data Lesson 6: Scatter Plots Lesson 7: Patterns in Scatter Plots Lesson 8: Informally Fitting a Line Lesson 9: Determining the Equation of a Line Fit to Data Module 6 Topic C Linear and Nonlinear Models Lesson 10: Linear Models Lesson 11: Using Linear Models in a Data Context Module 6 Topic D Bivariate Categorical Data	

	Lesson 13: Summarizing Bivariate Categorical Data in a Two-Way Table Lesson 14: Association Between Categorical Variables Additional Supplemental Resources Superhero Comparing Functions Activity Graphing Stories Matching Distance/Time Graphs activity Big Ideas BLUE Chapter 9 PTi3 Unit 9 Unit 10 Cycles 1 & 2 Unit 13 Cycles 1 Unit 13 Cycle 2
Authentic Examples (real-world tasks)	2018 Item Sampler #12 Estimation 180 3 Act Math Deodorant
Visual Representations & Strategies	Scatter Plots 2-Way Frequency Tables
Writing in Math	2018 Item Sampler #17
Higher Level DOK Tasks	How to Increase Cognitive Demand for Math Tasks

Unit of Study	Unit 10: Introduction to Irrational Numbers Using Geometry (8th U7)	
Time Frame/Pacing	25 Days	
Big Ideas	- Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools. - Mathematical relationships among numbers can be represented, compared, and communicated.	
Unit Essential Questions	- What does it mean to estimate or analyze numerical quantities? - When is it appropriate to estimate versus calculate? - What makes a tool and/or strategy appropriate for a given task? - How is mathematics used to quantify, compare, represent, and model numbers? - How can mathematics support effective communication?	
PA Core Standards		PA Assessment Anchors
CC.2.1.8.E.1 8.NS.1 CC.2.1.8.E.4 8.NS.2 CC.2.2.8.B.1 8.EE.2 CC.2.3.8.A.2 8.G.6 CC.2.3.8.A.2 8.G.7 CC.2.3.8.A.2 8.G.8 CC.2.3.8.A.3 8.G.9		M08.A-N.1 A1.1.1.1.1 A1.1.1.1.2 M08.B-E.1 M08.C-G.1 G.1.2.1.1 G.1.2.1.4 M08.C-G.2 G.2.1.1.1 G.2.1.2.1
PA Eligible Content	M08.A-N.1.1.1 Determine whether a number is rational or irrational. For rational numbers, show that the decimal expansion terminates or repeats (limit repeating decimals to thousandths).	
	M08.A-N.1.1.2 Convert a terminating or repeating decimal to a rational number (limit repeating decimals to thousandths).	
	M08.A-N.1.1.3 Estimate the value of irrational numbers without a calculator (limit whole number radicand to less than 144). Example: $\sqrt{5}$ is between 2 and 3 but closer to 2.	
	M08.A-N.1.1.4 Use rational approximations of irrational numbers to compare and order irrational numbers.	
	M08.A-N.1.1.5 Locate/identify rational and irrational numbers at their approximate locations on a number line.	
	M08.B-E.1.1.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of perfect squares (up to and including 12^2) and cube roots of perfect cubes (up to and including 5^3) without a calculator. Example: If $x^2 = 25$ then $x = \pm\sqrt{25}$.	

	M08.C-G.1.1.1 Identify and apply properties of rotations, reflections, and translations. Example: Angle measures are preserved in rotations, reflections, and translations. M08.C-G.1.1.2 Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them. M08.C-G.1.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. M08.C-G.1.1.4 Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them. M08.C-G.2.1.1 Apply the converse of the Pythagorean theorem to show a triangle is a right triangle. M08.C-G.2.1.2 Apply the Pythagorean theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (Figures provided for problems in three dimensions will be consistent with Eligible Content in grade 8 and below.) M08.C-G.2.1.3 Apply the Pythagorean theorem to find the distance between two points in a coordinate system.	
Learning Objectives (Concepts Taught)	Know that there are numbers that are not rational, and approximate them by rational numbers Work with radicals and integer exponents. *The balance of this cluster is taught in Module 1 Understand and apply the Pythagorean Theorem Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	
Performance Objectives (Skills Demonstrated)	• The Pythagorean Theorem • Square Roots • Existence and Uniqueness of Square Roots and Cube Roots • Simplify Square Roots • Solve Equations with Radicals • Finite and Infinite Decimals • The Long Division Algorithm • Decimal Expansions of Fractions • Convert Repeating Decimals to Fractions • The Decimal Expansion of Some Irrational Numbers • Compare Irrational Numbers • Decimal Expansion of π • Converse of the Pythagorean Theorem • Apply radicals and roots to Cones and Spheres, Truncated Cones Volume of Composite Solids, Average Rate of Change, Nonlinear Motion	
Key Vocabulary:	Cube Root Decimal Expansion (description) Decimal Expansion of a Negative Number Decimal Expansion of a Positive Real Number (description) Decimal System Irrational Number The nth Decimal Digit of a Decimal Expansion The nth Finite Decimal of a Decimal Expansion	Perfect Square Rational Approximation (description) Real Number (description) A Square Root of a Number The Square Root of a Number Truncated Cone (description) Decimal Expansion Finite Decimals Number Line Rate of Change Rational Number Value
Assessments	Mid-Module Assessment Task End-of-Module Assessment Task	

Resources and Differentiation Tools	PRIMARY RESOURCES Eureka Module 7 Topic A Square and Cube Roots Lesson 1: The Pythagorean Theorem Lesson 2: Square Roots Lesson 3: Existence and Uniqueness of Square Roots and Cube Roots Lesson 5: Solving Equations with Radicals (focus on simpler equations) Module 7 Topic B Decimal Expansions of Numbers Lessons 6: Finite & Infinite Decimals Lesson 10: Converting Repeating Decimals to Fractions Lesson 13: Comparing Irrational Numbers Module 7 Topic C The Pythagorean Theorem Lesson 15: Pythagorean Theorem, Revisited Lesson 16: Converse of the Pythagorean Theorem Lesson 17: Distance on the Coordinate Plane Lesson 18: Applications of the Pythagorean Theorem PTi3 Unit 2 Cycle 1 Rational & Irrational Numbers Lesson 1: Defining Irrational Numbers Lesson 2: Classifying Numbers Lesson 3: Converting a Decimal Expansion Additional Supplemental Resources Activities Graphic Organizer SMART NB PA Real Numbers SMART NB Repeating Decimals to Fractions with the Equation SMART NB Repeating Decimals to Fractions Big Ideas BLUE Chapter 7 PTi3 Unit 4 Cycles 1 & 2
Authentic Examples (real-world tasks)	2018 Item Sampler #15 Dan Meyer 3 Act Math Taco Cart
Visual Representations & Strategies	Real Numbers Diagram Real Numbers Notebook Files Number Line 3D Models-truncated cone & pyramid TinkerCad
Writing in Math	End-Of-Module Assessment, Question #1d
Higher Level DOK Tasks	How to Increase Cognitive Demand for Math Tasks