Secondary Curriculum Maps

Cumberland Valley School District

Soaring to Greatness, Committed to Excellence

7th Grade

Math (Pre-Algebra)

CVSD Math Curriculum Map ~ 7th Grade

PA Core Standard
CC.2.4.7.B.1 Draw inferences about populations based on random sampling concepts.
Taught in Unit(s)
Unit 5 (Statistics and Probability)
Explanation/Example of Standard
Use random samples.
Common Misconceptions
1. Students often expect the theoretical and experimental probabilities of the same data to match. 2. Students often expect that simulations will result in all of the possibilities. 3. Students often believe that one random sample is representative of the entire population.

Big Idea(s)	Essential Question(s)
1. Numerical measures describe the center and spread of numerical data. 2. The likelihood of an event occurring can be described numerically and used to make predictions.	How does the collection, analysis, organization, and interpretation of data help us to answer real world questions? What kind of questions can and cannot be answered from the data set and its display? How do we make predictions based on the outcomes of a probability experiment?

Assessments
See unit map for specific unit common assessments

Assessment Anchor	Eligible Content	
M07.D-S.1 Use random sampling to draw inferences about a population.	**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.
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Concepts (what students need to know)	**Skills** (what students must be able to do)
Data, Distributions, and Random Sampling	Draw inferences about two populations based on random sampling concepts.

	Draw informal comparative inferences about two populations using measures of center and measures of variability.

CVSD Math Curriculum Map ~ 7th Grade

PA Core Standard
CC.2.4.7.B.3 Investigate chance processes and develop, use, and evaluate probability models.
Taught in Unit(s)
Unit 5 (Statistics and Probability)
Explanation/Example of Standard
Predict or determine the likelihood of outcomes. Use probability to predict outcomes.
Common Misconceptions
1. Students often expect the theoretical and experimental probabilities of the same data to match. 2. Students often expect that simulations will result in all of the possibilities. 3. Students often believe that one random sample is representative of the entire population.

Big Idea(s)	Essential Question(s)
The likelihood of an event occurring can be described numerically and used to make predictions.	How does the collection, analysis, organization, and interpretation of data help us to answer real world questions? What kind of questions can and cannot be answered from the data set and its display? How do we make predictions based on the outcomes of a probability experiment?

Assessments
See unit map for specific unit common assessments

Assessment Anchor	Eligible Content	
M07.D-S.3 Investigate chance processes and develop, use, and evaluate probability models.	**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 ½ 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-	Find probabilities of independent compound events

	S.3.2.3	using organized lists, tables, tree diagrams, and simulation.
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Concepts (what students need to know)	**Skills** (what students must be able to do)
Data, Distributions, and Random Sampling	Draw inferences about two populations based on random sampling concepts. Determine and approximate relative frequencies and probabilities of events. Draw informal comparative inferences about two populations using measures of center and measures of variability. Find probabilities of independent compound events. Predict the approximate relative frequency given the probability. Find the probability of a simple event, including the probability of a simple event not occurring.

CVSD Math Curriculum Map ~ 7th Grade

PA Core Standard
CC.2.4.7.B.2 Draw informal comparative inferences about two populations.
Taught in Unit(s)
Unit 5 (Statistics and Probability)
Explanation/Example of Standard
Use statistical measures to compare two numerical data distributions.
Common Misconceptions
1. Students often expect the theoretical and experimental probabilities of the same data to match. 2. Students often expect that simulations will result in all of the possibilities. 3. Students often believe that one random sample is representative of the entire population.

Big Idea(s)	Essential Question(s)
1. Numerical measures describe the center and spread of numerical data. 2. The likelihood of an event occurring can be described numerically and used to make predictions.	How does the collection, analysis, organization, and interpretation of data help us to answer real world questions? What kind of questions can and cannot be answered from the data set and its display? How do we make predictions based on the outcomes of a probability experiment?

Assessments
See unit map for specific unit common assessments

Assessment Anchor	Eligible Content	
M07.D-S.2 Draw comparative inferences about populations.	**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, not 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.
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Concepts (what students need to know)	Skills (what students must be able to do)
Data, Distributions, and Random Sampling	Draw inferences about two populations based on random sampling concepts. Determine and approximate relative frequencies and probabilities of events. Draw informal comparative inferences about two populations using measures of center and measures of variability. Find probabilities of independent compound events. Predict the approximate relative frequency given the probability. Find the probability of a simple event, including the probability of a simple event not occurring.

CVSD Math Curriculum Map ~ 7th Grade

PA Core Standard
CC.2.3.8.A.1 Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems.
Taught in Unit(s)
Unit 6
Explanation/Example of Standard
Apply volume formulas of cones, cylinders, and spheres.
Common Misconceptions
1. Some students will mix up x- and y-axes on the coordinate plane, or mix up the ordered pairs. 2. A common misconception among middle grade students is that "volume" is a "number" that results from "substituting" other numbers into a formula. 3. Students see a constant rate of change as occurring only when distance between points on a table or graph is kept constant.

Big Idea(s)	Essential Question(s)
1. Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms. 2. The set of real numbers has infinite subsets including the sets of whole numbers, integers, rational, and irrational numbers. 3. Patterns exhibit relationships that can be extended, described, and generalized.	How and when can the Pythagorean Theorem help us to calculate the length of a segment without directly measuring it? Within polygons and polyhedra, how can we use angle relationships to solve mathematical problems? How do we recognize when it is appropriate to use a linear model to represent a real world situation, and what are the benefits of using a linear model to answer questions about the situation? How can you choose a scale for your graphs so that the graph best represents a situation? How can we choose a scale so that the chosen scale distorts the data or misleads the reader?

Assessments
See unit map for specific unit common assessments

Assessment Anchor	Eligible Content	
M08.C-G.3 Solve real world and mathematical problems involving volume.	**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.

Concepts (what students need to know)	**Skills** (what students must be able to do)
Cylinders, Cones, and Spheres	Define, interpret, and compare functions displayed algebraically, graphically, numerically in tables, or by verbal descriptions.

CVSD Math Curriculum Map ~ 7th Grade

PA Core Standard
CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools.
Taught in Unit(s)
Unit 6
Explanation/Example of Standard
Apply properties of geometric transformations to verify congruence or similarity.
Common Misconceptions
1. Pi is exactly 3.14. 2. Many students are confused when dealing with circumference (linear measurement) and area.

Big Idea(s)	Essential Question(s)
Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms. The set of real numbers has infinite subsets including the sets of whole numbers, integers, rational, and irrational numbers. Patterns exhibit relationships that can be extended, described, and generalized.	How and when can the Pythagorean Theorem help us to calculate the length of a segment without directly measuring it? Within polygons and polyhedra, how can we use angle relationships to solve mathematical problems? How do we recognize when it is appropriate to use a linear model to represent a real world situation, and what are the benefits of using a linear model to answer questions about the situation? How can you choose a scale for your graphs so that the graph best represents a situation? How can we choose a scale so that the chosen scale distorts the data or misleads the reader?

Assessments
See unit map for specific unit common assessments

Assessment Anchor	Eligible Content	
M08.C-G.1 Demonstrate an understanding of geometric transformations.	**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.1.13	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.

Concepts (what students need to know)	**Skills** (what students must be able to do)
Cylinders, Cones, and Spheres	Use transformations to demonstrate congruence and similarity of geometric figures. Use various tools to understand and apply geometric transformations to geometric figures.

CVSD Math Curriculum Map ~ 7th Grade

PA Core Standard
CC.2.3.7.A.1 Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume.
Taught in Unit(s)
Unit 5
Explanation/Example of Standard
Identify, use, and describe properties of angles and their measures. Determine circumference, area, surface area, and volume.
Common Misconceptions
1. Pi is exactly 3.14. 2. Many students are confused when dealing with circumference (linear measurement) and area.

Big Idea(s)	Essential Question(s)
1. Some questions can be answered by collecting, representing, and analyzing data, and the question to be answered determines the data to be collected, how best to collect it, and how best to represent it. 2. Similarity relationships between objects are a form of proportional relationships. Congruence describes a special similarity relationship between objects and is a form of equivalence.	How can the decomposition of 3-dimensional shapes aid in the understanding of surface areas and volumes? How can we use the relationship between surface area and volume to help us draw, construct, model, and represent real situations and/or solve problems of surface area and volume? How can we use proportionality represented through models of and models for ratio tables, factor-of-change (scale factor), a unit rate, and cross-multiplication to solve real world problems?

Assessments
See unit map for specific unit common assessments

Assessment Anchor	Eligible Content	
M07.C-G.2 Solve real-world and mathematical problems involving angle measure, circumference, area, surface area, and volume.	**M07.C-G.2.1.1**	Identify and use properties of supplementary, complementary, and adjacent angles in a multistep 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.2.2.1	Find the area and circumference of a circle. Solve problems involving area and circumference of a circle(s). Formulas will be provided.
	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.

Concepts (what students need to know)	**Skills** (what students must be able to do)
Area, Volume, Angles, and Circumference	Use properties of angle types and properties of angles formed when two parallel lines are cut by a transversal line to solve problems. Solve problems involving area and circumference of a circle(s). Solve mathematical problems involving area, volume and surface area of two- and three-dimensional objects.

CVSD Math Curriculum Map ~ 7th Grade

PA Core Standard
CC.2.3.7.A.2 Visualize and represent geometric figures and describe the relationships between them.
Taught in Unit(s)
Unit 6
Explanation/Example of Standard
Describe and apply properties of geometric figures.
Common Misconceptions
1. Pi is exactly 3.14. 2. Many students are confused when dealing with circumference (linear measurement) and area.

Big Idea(s)	Essential Question(s)
1. Some questions can be answered by collecting, representing, and analyzing data, and the question to be answered determines the data to be collected, how best to collect it, and how best to represent it. 2. Similarity relationships between objects are a form of proportional relationships. Congruence describes a special similarity relationship between objects and is a form of equivalence.	How can the decomposition of 3-dimensional shapes aid in the understanding of surface areas and volumes? How can we use the relationship between surface area and volume to help us draw, construct, model, and represent real situations and/or solve problems of surface area and volume? How can we use proportionality represented through models of and models for ratio tables, factor-of-change (scale factor), a unit rate, and cross-multiplication to solve real world problems?

Assessments
See unit map for specific unit common assessments

Assessment Anchor	Eligible Content	
M07.C-G.1 Demonstrate an understanding of geometric figures and their properties.	**M07.C-G.1.1.1**	Solve problems involving scale drawings of geometric figures, including finding length and area.
	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 triangular prisms and right rectangular pyramids.

Concepts (what students need to know)	**Skills** (what students must be able to do)
Geometric Figures	Solve problems involving scale drawings of geometric figures. Apply the properties of all types of triangles based on angle and side measure including the triangle inequality theorem. Describe the two-dimensional figures that result from slicing three-dimensional figures.
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CVSD Math Curriculum Map ~ 7th Grade

PA Core Standard
CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.
Taught in Unit(s)
Unit 2 (Rational Numbers), Unit 3 (Expressions and Equations)
Explanation/Example of Standard
Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers. Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems. Determine the reasonableness of the answer(s) in problem solving situations.
Common Misconceptions
1. Confusion between how to identify rational and irrational numbers. The confusion seems to lie in their understanding of repeating vs. non-repeating decimals. 2. As students begin to build and work with expressions containing more than two operations, students tend to set aside the order of operations. For example having a student simplify an expression like 8 + 4(2x - 5) + 3x can bring to light several misconceptions. Students do not associate the distributive property with multiplication in the order of operations. In this case adding the 8 and the 4 prior to distribution. 3. Expressions with operation symbols are seen as “unfinished”. 4. When combining like expressions students tend to “leave behind” negative signs with numbers and variable expressions.

Big Idea(s)	Essential Question(s)
Two variable quantities are proportional if their values are in a constant ratio. The relationship between proportional quantities can be represented as a linear function. Relations and functions are mathematical relationships that can be represented and analyzed using words, tables, graphs, and equations. Similarity relationships between objects are a form of proportional relationships. Congruence describes a special similarity relationship between objects and is a form of equivalence.	How can we use proportionality represented through models of and models for ratio tables, factor-of-change (scale factor), a unit rate, and cross-multiplication to solve real world problems? What are the connections among the different representations of a linear relationship? How does the representation support the linear relationship? (ie. Where in each representation can you find the rate of change, the y-intercept, etc.?) How can the decomposition of 3-dimensional shapes aid in the understanding of surface areas and volumes?

	How can we use the relationship between surface area and volume to help us draw, construct, model, and represent real situations and/or solve problems of surface area and volume? How can we use proportionality represented through models of and models for ratio tables, factor-of-change (scale factor), a unit rate, and cross-multiplication to solve real world problems?

Assessments
See unit map for specific unit common assessments

Assessment Anchor	**Eligible Content**	
M07.B-E.2 Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.	**M07.B-E.2.1.1**	Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate. Example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50 an hour (or 1.1 x $25 = $27.50).
	M07.B-E.2.2.1	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Example: The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?
	M07.B-E.2.2.2	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers, and graph the solution set of the inequality. Example: A salesperson is paid $50 per week plus $3 per sale. This week she wants her pay to be at least $100. Write an inequality for the number of sales the salesperson need to make and describe the solutions.
	M07.B-E.2.3.1	Determine the reasonableness of answer(s) or interpret the solution(s) in the context of the problem. Example: If you want to place a towel bar that is 9 ¾ inches long in the center of a door that is 27 ½ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

Concepts (what students need to know)	**Skills** (what students must be able to do)
Ratios, Proportions, and Percent	Compute unit rates associated with ratios of fractions. Recognize and represent proportional relationships between quantities. Use proportional relationships to solve multistep ratio and percent problems.

CVSD Math Curriculum Map ~ 7th Grade

PA Core Standard	
CC.2.1.7.D.1 Analyze proportional relationships and use them to model and solve real-world and mathematical problems.	
Taught in Unit(s)	
Unit 4	
Explanation/Example of Standard	
Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems.	
Common Misconceptions	
1. Fractions and ratios may represent different comparisons. 2. Ratios can be added like fractions 3. Students struggle with the freedom afforded to them when working with and comparing ratios	
Big Idea(s)	**Essential Question(s)**
1. Numbers, measures, expressions, equations, and inequalities can represent mathematical situations and structures in many equivalent forms. 2. Some questions can be answered by collecting, representing, and analyzing data, and the question to be answered determines the data to be collected, how best to collect it, and how best to represent it. 3. Numerical quantities and calculations can be estimated by using numbers that are close to the actual values, but easier to compute. 4. The set of real numbers has infinite subsets including the sets of whole numbers, integers, rational, and irrational numbers. 5. Two variable quantities are proportional if their values are in a constant ratio. The relationship between proportional quantities can be represented as a linear function. 6. Relations and functions are mathematical relationships that can be represented and analyzed using words, tables, graphs, and equations.	How is computation with rational numbers similar and different to whole number computation? How can we use proportionality represented through models of and models for ratio tables, factor-of –change(scale factor), a unit rate, and cross-multiplication to solve real world problems? What are the connections among the different representations of a linear relationship? How does the representation support the linear relationship? (ie. Where in each representation can you find the rate of change, the y-intercept, etc?) How can the decomposition of 3-dimensional shapes aid in the understanding of surface areas and volumes? How can we use the relationship between surface area and volume to help us draw, construct, model, and represent real situations and /or solve problems of surface area and volume?
Assessments	
See unit map for specific unit common assessments	

Assessment Anchor	Eligible Content	
M07.A-R.1 Demonstrate an understanding of proportional relationships.	**M07.A-R.1.1.1**	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. Example: If a person walks ½ mile in each ¼ hour, compute the unit rate as the complex fraction ½ / ¼ miles per hour, equivalently 2 miles per hour.
	M07.A-R.1.1.2	Determine whether two quantities are proportionally related (e.g., by testing for equivalent ratios in a table, graphing on a coordinate plane and observing whether the graph is a straight line through the origin).
	M07.A-R.1.1.3	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
	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.1.1.5	Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r), where r is the unit rate.
	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.

Concepts (what students need to know)	**Skills** (what students must be able to do)
Ratios, Proportions, and Percent	Compute unit rates associated with ratios of fractions. Recognize and represent proportional relationships between quantities. Use proportional relationships to solve multistep ratio and percent problems.