

Course Title: 7th Grade Math

Board Approval Date: 6/2018

Credit / Hours:

Reviewed Annually

Course Description:

Seventh grade math focuses on mastery of the PA Academic Standards for 7th grade math and incorporates the Assessment Anchors and Eligible Content. As students progress through this course, they will learn operations on rational numbers, expressions and equations, inequalities, proportional relationships, percents, angles and triangles, plane geometry and similarity, surface area, volume, data and statistics, and probability. Integrated into every unit are rigorous, real-world applications of the standards.

Learning Activities / Modes of Assessment:

Direct Instruction
Guided Notes
Cooperative/Small Group Work
Stations
Teacher Observations
Quizzes/Tests
AIMSWEB/CDTs

Instructional Resources:

Teacher made resources aligned to standards, eligible content, and assessment anchors.

Study Island

iXL

Other various applications

Course Pacing Guide
7th Grade Math

<u>Unit Name</u>	<u>Days of Instruction</u>
Unit 1 Rational Numbers	20
Unit 2 Expressions and Equations	20
Unit 3 Inequalities	12
Unit 4 Proportional Relationships	30
Unit 5 Percents	15
Unit 6 Angles and Triangles	20
Unit 7 Plane Geometry and Similarity	20
Unit 8 Surface Area	10
Unit 9 Volume	10
Unit 10 Data and Statistics	10
Unit 11 Probability	10
	<hr/> 177 days

Topic: Unit 1: Rational Numbers
 Subject(s): 7th Grade Math

Days: 20
 Grade(s): 7th

Know:	Understand:	Do:
Absolute Value Difference Integer Natural Number Numerical Expression Product Opposite Quotient Rational Number Reciprocal Sum Whole Number	<p>Understanding add and subtract rational numbers.</p> <p>Understand situations in which opposites combine to make zero.</p> <p>Understand multiply and divide rational numbers.</p> <p>Understand solving real-world and mathematical problems involving the four operations with rational numbers.</p>	<p>M07.A-N.1.1.1 Apply properties of operations to add and subtract rational numbers, including real-world situations.</p> <p>M07.A-N.1.1.2 Represent addition and subtraction on a horizontal or vertical number line.</p> <p>M07.A-N.1.1.3 Apply properties of operations to multiply and divide rational numbers, including real-world contexts; demonstrate that the decimal form of a rational number terminates or eventually repeats.</p> <p>M07.B-E.2.1.1 Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate.</p>

Topic: Unit 2: Equations and Expressions
Subject(s): 7th Grade Math

Days: 20
Grade(s): 7th

Know:	Understand:	Do:
Algebraic Expressions Associate Property Coefficient Commutative Property Distributive Property Equation Equivalent Evaluate Expressions Identity Property Simplify Variable	Understanding properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. Understand solving multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals) Understand using variables to represent quantities	M07.B-E.1.1.1 Use properties of operations to generate equivalent expressions. M07.B-E.2.2.1 Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems.

Unit Essential Question:
How do you perform operations on rational numbers?

<u>Concept:</u> Adding and Subtracting Integers	<u>Concept:</u> Adding and Subtracting Rational Numbers	<u>Concept:</u> Multiplying and Dividing Integers	<u>Concept:</u> Multiplying and Dividing Rational Numbers
↓	↓	↓	↓
<u>Lesson Essential Question/s:</u> How are numbers represented on a number line? How do you add integers? How do you subtract integers?	<u>Lesson Essential Question/s:</u> How do you add rational numbers? How do you subtract rational numbers?	<u>Lesson Essential Question/s:</u> How do you multiply integers? How do you divide integers?	<u>Lesson Essential Question/s:</u> How do you multiply rational numbers? How do you divide rational numbers?
↓	↓	↓	↓
<u>Vocabulary:</u> <ul style="list-style-type: none"> • Absolute Value • Opposites • Integer • Natural Number • Whole Number • Sum • Difference • Numerical Expression 	<u>Vocabulary:</u> <ul style="list-style-type: none"> • Rational Number 	<u>Vocabulary:</u> <ul style="list-style-type: none"> • Product • Quotient 	<u>Vocabulary:</u> <ul style="list-style-type: none"> • Reciprocal

Course/Subject: 7th Grade Math

Length of instruction: 20 Days

Unit 2 Expressions and Equations

Unit Essential Question:

How do you simplify expressions and solve equations?

<u>Concept:</u> Expressions	<u>Concept:</u> Equations	<u>Concept:</u> Real-World Applications	<u>Concept:</u>
↓	↓	↓	↓
<u>Lesson Essential Question/s:</u> How do you combine like terms? How do you simplify using the distributive property? How do you factor an expression?	<u>Lesson Essential Question/s:</u> How do you solve one-step equations? How do you solve two-step equations? How do you solve two-step equations with rational numbers? How do you solve multi-step equations?	<u>Lesson Essential Question/s:</u> How do you write and solve equations to model real-life problems?	<u>Lesson Essential Question/s:</u>
↓	↓	↓	↓
<u>Vocabulary:</u> <ul style="list-style-type: none">• Expression• Equivalent• Like Terms• Term• Coefficient• Constant Term• Variable Term• Simplify	<u>Vocabulary:</u> <ul style="list-style-type: none">• Evaluate	<u>Vocabulary:</u>	<u>Vocabulary:</u>

<ul style="list-style-type: none">• Distributive Property• Factoring			
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Course/Subject: 7th Grade Math

Length of instruction: 12 Days

Unit 3 Inequalities

Unit Essential Question:
How do you solve and graph inequalities?

<u>Concept:</u> Inequalities	<u>Concept:</u>	<u>Concept:</u> Real-World Applications	<u>Concept:</u>
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<u>Lesson Essential Question/s:</u> How do you solve and graph inequalities	<u>Lesson Essential Question/s:</u>	<u>Lesson Essential Question/s:</u> How do you write and solve inequalities to model real-life problems?	<u>Lesson Essential Question/s:</u>
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<u>Vocabulary:</u> <ul style="list-style-type: none">• Inequality• Greater than• Less than• Greater than or equal to• Less than or equal to	<u>Vocabulary:</u>	<u>Vocabulary:</u>	<u>Vocabulary:</u>
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Topic: Unit 3: Inequalities
Subject(s): 7th Grade Math

Days: 12
Grade(s): 7th

Know:	Understand:	Do:
<p>Inequality Greater than Less than Greater than or equal to Less than or equal to</p>	<p>Understand how variables are used to represent quantities in real-world or mathematical problems, and construct simple equations and inequalities to solve problems by reasoning about the quantities.</p> <p>Understand how to 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. Graph the solution set of the inequality and interpret it in the context of the problem.</p>	<p>M07.B-E.1.1.1 Use properties of operations to generate equivalent expressions.</p> <p>M07.B-E.2.2.1 Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems.</p>

Unit Essential Question:
How do you represent proportional relationships?

<u>Concept:</u> Constant of Proportionality	<u>Concept:</u> Proportional Relationships	<u>Concept:</u> Unit Rates	<u>Concept:</u>
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<u>Lesson Essential Question/s:</u> How do you find and apply the constant of proportionality?	<u>Lesson Essential Question/s:</u> How do you represent a proportional relationship in a table? How do you represent a proportional relationship in a graph? How do you represent a proportional relationship in an equation?	<u>Lesson Essential Question/s:</u> How do you find and apply unit rates in proportional relationships?	<u>Lesson Essential Question/s:</u>
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<u>Vocabulary:</u> <ul style="list-style-type: none"> • Constant of Proportionality • Proportional 	<u>Vocabulary:</u> <ul style="list-style-type: none"> • Axis • Coordinate Grid • Dependent Variable • Independent Variable • Linear • Non-linear 	<u>Vocabulary:</u> <ul style="list-style-type: none"> • Rate • Rate of Change • Unit Price • Unit Rate 	<u>Vocabulary:</u>
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	<ul style="list-style-type: none">• Non-proportional• Ordered Pair• Origin• x-axis• y-axis		
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Unit Essential Question:
How do you solve problems involving percents?

<u>Concept:</u> Ratios and Proportions	<u>Concept:</u> Applications of Percent	<u>Concept:</u>	<u>Concept:</u>
↓	↓	↓	↓
<u>Lesson Essential Question/s:</u> How do you solve percent proportions and equations?	<u>Lesson Essential Question/s:</u> How do you solve multi-step percent problems? How do you find percent change? How do you find simple interest?	<u>Lesson Essential Question/s:</u>	<u>Lesson Essential Question/s:</u>
↓	↓	↓	↓
<u>Vocabulary:</u> <ul style="list-style-type: none">• Percent Proportion• Percent Equation	<u>Vocabulary:</u> <ul style="list-style-type: none">• Commission• Mark Down• Mark Up• Percent• Percent Change• Percent Decrease• Percent Increase• Sales Tax	<u>Vocabulary:</u>	<u>Vocabulary:</u>

	<ul style="list-style-type: none">• Simple Interest• Tip (Gratuity)• Unit Rate		
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Topic: Unit 5: Percents
Subject(s): 7th Grade Math

Days: 15
Grade(s): 7th

Know:	Understand:	Do:
<p>Commission Mark Down Mark Up Percent Percent Change Percent Equation Percent Decrease Percent Increase Percent Proportion Proportion Sales Tax Simple Interest Tip (Gratuity) Unit Rate</p>	<p>Understand how a percent is a part of a whole (total) and apply that to a variety of multi-step percent problems.</p> <p>Understand how to use proportional relationships to solve multistep ratio and percent problems.</p> <p>Understand how to recognize and represent proportional relationships between quantities.</p>	<p>M07.B-E.2.1.1 Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate.</p> <p>M07.A-R.1.1.6 Use proportional relationships to solve multi-step ratio and percent problems.</p>

Topic: Unit 6: Angles & Triangles
 Subject(s): 7th Grade Math

Days: 20
 Grade(s): 7th

Know:	Understand:	Do:
Acute Angle Acute Triangle Adjacent Angles Alternate Exterior Angles Alternate Interior Angles Complementary Angles Congruent Corresponding Isosceles Triangle Obtuse Angle Obtuse Triangle Parallel Lines Right Angle Right Triangle Scalene Triangle Straight Angle Supplementary Transversal Triangle Inequality Theorem Vertex Vertical Angles Equivalent Triangle	Understand how to use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. Understand how to construct triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	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.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 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).

Course/Subject: 7th Grade Math

Length of instruction: 20 Days

Unit 6 Angles and Triangles

Unit Essential Question:

How are angles and triangles related?

<u>Concept:</u> Angle Relationships	<u>Concept:</u> Triangles	<u>Concept:</u>	<u>Concept:</u>
↓	↓	↓	↓
<u>Lesson Essential Question/s:</u> How are complementary and supplementary angles related? How are vertical and adjacent angles related? How are angles related when two parallel lines are cut by a transversal?	<u>Lesson Essential Question/s:</u> How are angles in a triangle related? How are sides in a triangle related? How do you use and apply the Triangle Inequality Theorem?	<u>Lesson Essential Question/s:</u>	<u>Lesson Essential Question/s:</u>
↓	↓	↓	↓
<u>Vocabulary:</u> <ul style="list-style-type: none">• Acute Angle• Adjacent Angles• Alternate Exterior Angles• Alternate Interior Angles• Complementary Angle• Congruent• Corresponding	<u>Vocabulary:</u> <ul style="list-style-type: none">• Acute Triangle• Isosceles Triangle• Obtuse Triangle• Right Triangle• Scalene Triangle• Triangle Inequality Theorem• Vertex	<u>Vocabulary:</u>	<u>Vocabulary:</u>

<ul style="list-style-type: none">• Obtuse Angle• Parallel Lines• Right Angle• Straight Angle• Supplementary• Transversal• Vertical Angles	<ul style="list-style-type: none">• Equilateral Triangle		
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Topic: Unit 7: Plane Geometry and Similarity
 Subject(s): 7th Grade Math

Days: 20
 Grade(s): 7th

Know:	Understand:	Do:
Circle	Understand how to solve problems involving scale drawings of geometric figures.	M07.C-G.1.1.1 Solve problems involving scale drawing of geometric figures, including finding length and area.
Circumference		M07.C-G.1.1.4 Describe the two-dimensional figures that result from slicing three-dimensional figures.
Cube	Understand the formulas for the area and circumference of a circle and use them to solve problems.	M07.C-G.2.2.1 Find the area and circumference of a circle. Solve problems involving area and circumference of a circle(s).
Cylinder		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.
Diameter		
Edge	Understand how to solve real-world mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	
Face		
Irregular Polygon		
Leg		
Net		
Prism		
Pyramid		
Radius		
Rectangular Prism		
Regular Polygon		
Scale Drawing		
Scale Factor		
Similar		
Surface Area		

Topic: Unit 8: Surface Area
Subject(s): 7th Grade Math

Days: 10
Grade(s): 7th

Know:	Understand:	Do:
Cube Edge Face Leg Net Prism Pyramid Rectangular Prism Regular Polygon Surface Area	Understand how to solve real-world mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	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.

Unit 7 Plane Geometry and Similarity

Unit Essential Question:

How do you find the area of plane geometric figures?

How are similar figures and scale drawings related?

<u>Concept:</u> Circles	<u>Concept:</u> Area of Two-Dimensional Figures	<u>Concept:</u> Similarity	<u>Concept:</u>
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<u>Lesson Essential Question/s:</u> How do you find the circumference of a circle? How do you find the area of a circle?	<u>Lesson Essential Question/s:</u> How do you find the area of a two-dimensional figures? How do you find the area of composite figures?	<u>Lesson Essential Question/s:</u> How are corresponding sides and corresponding angles related in similar figures? How do you find missing measurements in similar figures? How do you solve problems involving scale drawings?	<u>Lesson Essential Question/s:</u>
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<u>Vocabulary:</u> <ul style="list-style-type: none"> • Circle • Circumference • Diameter • Radius • Regular Polygon 	<u>Vocabulary:</u> <ul style="list-style-type: none"> • Edge • Base • Height • Irregular Polygon • Leg 	<u>Vocabulary:</u> <ul style="list-style-type: none"> • Scale Drawing • Scale Factor • Similar 	<u>Vocabulary:</u>
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Course/Subject: 7th Grade Math

Length of instruction: 10 Days

Unit 8 Surface Area

Unit Essential Questions:
How do you find the area of plane geometric figures?
How are similar figures and scale drawings related?

<u>Concept:</u> Circles	<u>Concept:</u> Area of Two-Dimensional Figures	<u>Concept:</u> Similarity	<u>Concept:</u>
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<u>Lesson Essential Question/s:</u> How do you find the circumference of a circle? How do you find the area of a circle?	<u>Lesson Essential Question/s:</u> How do you find the area of a two-dimensional figure? How do you find the area of composite figures?	<u>Lesson Essential Question/s:</u> How are corresponding sides and corresponding angles related in similar figures? How do you find missing measurements in similar figures? How do you solve problems involving scale drawings?	<u>Lesson Essential Question/s:</u>
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<u>Vocabulary:</u> <ul style="list-style-type: none">• Circle• Circumference• Diameter• Radius• Regular Polygon	<u>Vocabulary:</u> <ul style="list-style-type: none">• Edge• Base• Height• Irregular Polygon• Leg	<u>Vocabulary:</u> <ul style="list-style-type: none">• Scale Drawing• Scale Factor• Similar	<u>Vocabulary:</u>
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Topic: Unit 9: Volume
Subject(s): 7th Grade Math

Days: 10
Grade(s): 7th

Know:	Understand:	Do:
Cube Edge Face Leg Net Prism Pyramid Rectangular Prism Regular Polygon Volume	Understand how to solve real-world mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	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.

Unit 9 Volume

Unit Essential Questions:
How do you find volume?

<u>Concept:</u> Cross-Sections	<u>Concept:</u> Volume	<u>Concept:</u>	<u>Concept:</u>
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<u>Lesson Essential Question/s:</u> How do you find the area of a cross-section?	<u>Lesson Essential Question/s:</u> How do you find the volume of three-dimensional figures? How do you solve problems involving volume?	<u>Lesson Essential Question/s:</u>	<u>Lesson Essential Question/s:</u>
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<u>Vocabulary:</u> <ul style="list-style-type: none">• Cube• Cross Section• Prism• Pyramid• Rectangular Prism• Regular Polygon	<u>Vocabulary:</u> <ul style="list-style-type: none">•	<u>Vocabulary:</u> <ul style="list-style-type: none">•	<u>Vocabulary:</u>
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Topic: Unit 10: Data and Statistics
 Subject(s): 7th Grade Math

Days: 10
 Grade(s): 7th

Know:	Understand:	Do:
Biased Sample Box plot Dot plot Interquartile Range Median Mean Mean Absolute Deviation Measures of Center Measures of Variability Population Outlier Quartile Range Sample Spread Survey Unbiased Sample	<p>Understand that statistics can be used to gain information about a population by examining a sample of the population.</p> <p>Understand how to use data from a random sample to draw inferences about a population with an unknown characteristic of interest.</p> <p>Understand how to use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.</p>	<p>M07.D-S.1.1.1 Determine whether a sample is a random sample given a real-world situation.</p> <p>M07.D-S.1.1.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.</p> <p>M07.D-S.2.1.1 Compare two numerical data distributions using measures of center and variability.</p>

Unit Essential Questions:
How do you compare data?

<u>Concept:</u> Samples and Populations	<u>Concept:</u> Measures of Center and Variability	<u>Concept:</u> Comparing Data Sets	<u>Concept:</u>
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<u>Lesson Essential Question/s:</u> How are samples and populations related? How can you use samples to make inferences about the population?	<u>Lesson Essential Question/s:</u> How do you find and use the measures of center? How do you find and use the measures of variability?	<u>Lesson Essential Question/s:</u> How do you compare two data sets using measures of center and variability?	<u>Lesson Essential Question/s:</u>
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<u>Vocabulary:</u> <ul style="list-style-type: none"> • Biased Sample • Population • Sample • Survey • Unbiased Sample 	<u>Vocabulary:</u> <ul style="list-style-type: none"> • Box plot • Dot plot • Interquartile Range • Median • Mean • Mean Absolute Deviation • Measures of Center • Measures of Variability 	<u>Vocabulary:</u> <ul style="list-style-type: none"> • 	<u>Vocabulary:</u>
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	<ul style="list-style-type: none">• Outlier• Quartile• Range• Spread		
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Topic: Unit 11: Probability
 Subject(s): 7th Grade Math

Days: 10
 Grade(s): 7th

Know:	Understand:	Do:
<p>Complementary Events</p> <p>Compound Evets</p> <p>Dependent Events</p> <p>Independent Events</p> <p>Experimental Probability</p> <p>Theoretical Probability</p> <p>Outcome</p> <p>Probability</p> <p>Random Event</p> <p>Relative Frequency</p> <p>Sample Space</p> <p>Simple Event</p>	<p>Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.</p> <p>Understand how to approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency and predict the approximate relative frequency given the probability.</p> <p>Understand how to find the probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</p>	<p>M07.D-S.3.1.1 Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible.</p> <p>M07.D-3.2.1 Determine the probability of a chance event given relative frequency and predict the approximate relative frequency given the probability.</p> <p>M07.D-3.2.2 Find the probability of a simple event, including the probability of a simple event not occurring.</p> <p>M07.D-S.3.2.3 Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.</p>

Course/Subject: 7th Grade Math

Length of instruction: 10 Days

Unit 11 Probability

Unit Essential Questions:
How do you find probability?

<u>Concept:</u> Simple Probability	<u>Concept:</u> Compound Probability	<u>Concept:</u>	<u>Concept:</u>
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<u>Lesson Essential Question/s:</u> How do you find the probability of a simple event? How do you find the sample space of an event? How are experimental and theoretical probability related? How can probability help make predications?	<u>Lesson Essential Question/s:</u> How do you find the probability of independent events? How do you find the probability of dependent events?	<u>Lesson Essential Question/s:</u>	<u>Lesson Essential Question/s:</u>
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<u>Vocabulary:</u> <ul style="list-style-type: none">• Complementary Events• Experimental Probability• Theoretical Probability• Outcome• Probability• Random Event• Relative Frequency	<u>Vocabulary:</u> <ul style="list-style-type: none">• Compound Evets• Dependent Events• Independent Events	<u>Vocabulary:</u>	<u>Vocabulary:</u>
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<ul style="list-style-type: none">• Sample Space• Simple Event			
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