



Arizona Mathematic Standards

Mathematics Curriculum Map

Seventh Grade

ARIZONA DEPARTMENT OF EDUCATION
HIGH ACADEMIC STANDARDS

Mathematics – Seventh Grade
Chandler Unified School District Standards
Seventh Grade – At a Glance

Curriculum Map

Curriculum Map									
Semester 1 The Number System (NS) Ratio and Proportion (RP)				Semester 2 Expressions and Equations (EE) Geometry (G) Statistics and Probability (SP)					
Chapter 1 Ratios and Proportional Reasoning	Chapter 2 Percents	Chapter 3 Integers	Chapter 4 Rational Numbers	Chapter 5 Expressions	Chapter 6 Equations and Inequalities	Chapter 7 Geometric Figures	Chapter 8 Measure Figures	Chapter 9 Probability	Chapter 10 Statistics
7.RP.1 7.RP.2 7.RP.2a 7.RP.2b 7.RP.2c 7.RP.2d 7.RP.3 7.NS.3	7.RP.2 7.RP.2c 7.RP.3 7.EE.2 7.EE.3	7.NS.1 7.NS.1a 7.NS.1b 7.NS.1c 7.NS.1d 7.NS.2 7.NS.2a 7.NS.2b 7.NS.2c 7.NS.2d 7.NS.3 7.EE.3	7.NS.1 7.NS.1a 7.NS.1b 7.NS.1c 7.NS.1d 7.NS.2 7.NS.2a 7.NS.2b 7.NS.2c 7.NS.2d 7.NS.3 7.RP.3 7.EE.3	7.EE.1 7.EE.2 7.EE.3	7.EE.3 7.EE.4 7.EE.4a 7.EE.4b	7.G.1 7.G.2 7.G.3 7.G.5	7.G.4 7.G.6	7.SP.5 7.SP.6 7.SP.7a 7.SP.7b 7.SP.8	7.SP.1 7.SP.2 7.SP.3 7.SP.4
Mathematical Practices									
1. Make sense of problems and persevere in solving them.					5. Use appropriate tools strategically.				
2. Reason abstractly and quantitatively.					6. Attend to precision.				
3. Construct viable arguments and critique the reasoning of others.					7. Look for and make use of structure.				
4. Model with mathematics.					8. Look for and express regularity in repeated reasoning.				
All units will include the Mathematical Practices									

NOTE: Mathematical standards are interwoven and should be addressed throughout the year in as many different units and tasks as possible in order to stress the natural connections that exist among mathematical topics.

Grade 7 Key: NS = The Number System, RP = Ratios and Proportional Relationships, EE = Expressions and Equations, SP = Statistics and Probability, G = Geometry

Seventh Grade Overview

Ratios and Proportional Relationships (RP)

- Analyze proportional relationships and use them to solve mathematical problems and problems in real-world context.

The Number System (NS)

- Apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers except division by zero.

Expressions and Equations (EE)

- Use properties of operations to generate equivalent expressions.
- Solve mathematical problems and problems in real-world context using numerical and algebraic expressions and equations.

Geometry (G)

- Draw, construct, and describe geometrical figures, and describe the relationships between them.
- Solve mathematical problems and problems in real-world context involving angle measure, area, surface area, and volume.

Statistics and Probability (SP)

- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use, and evaluate probability models.

Standards for Mathematical Practices (MP)

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 express regularity in repeated reasoning.

Seventh Grade Content Emphasis

Seventh Grade Content Emphasis	
Ratios and Proportional Relationships (RP)	
●	Analyze proportional relationships and use them to solve mathematical problems and problems in real-world context.
The Number System (NS)	
●	Apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers except division by zero.
Expressions and Equations (EE)	
●	Use properties of operations to generate equivalent expressions.
●	Solve mathematical problems and problems in real-world context using numerical and algebraic expressions and equations.
Geometry (G)	
▲	Draw, construct, and describe geometrical figures and describe the relationships between them.
▲	Solve mathematical problems and problems in real-world context involving angle measure, area, surface area, and volume.
Statistics and Probability (SP)	
▲	Use random sampling to draw inferences about population.
▲	Draw informal comparative inferences about two populations.
▲	Investigate chance processes and develop, use, and evaluate probability needs.
● -Major Content ▲ -Supporting Content	
Major content (●) from the content emphasis section should account for approximately 70% of instructional time.	

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Table 3. Fluency Expectations Across All Grade Levels.

Grade	Coding	Fluency Expectations
K	K.OA.A.5	Fluently add and subtract within 5.
1	1.OA.C.5	Fluently add and subtract within 10.
2	2.OA.B.2 2.NBT.B.5	Fluently add and subtract within 20. By the end of 2 nd grade, know from memory all sums of two one-digit numbers. Fluently add and subtract within 100.
3	3.NBT.A.2 3.OA.C.7	Fluently add and subtract within 1000. Fluently multiply and divide within 100. By the end of 3 rd grade, know from memory all multiplication products through 10 x 10 and division quotients when both the quotient and divisor are less than or equal to 10.
4	4.NBT.B.4	Fluently add and subtract multi-digit whole numbers using a standard algorithm.
5	5.NBT.B.5	Fluently multiply multi-digit whole numbers using a standard algorithm.
6	6.NS.B.2 6.NS.B.3 6.EE.A.2	Fluently divide multi-digit numbers using a standard algorithm. Fluently add, subtract, multiply, and divide multi-digit decimals using a standard algorithm for each operation. Write, read, and evaluate algebraic expressions.
7	7.NS.A.1.d 7.NS.A.2.c 7.EE.B.4.a	Apply properties of operations as strategies to add and subtract rational numbers. Apply properties of operations as strategies to multiply and divide rational numbers. Fluently solve one-variable equations of the form $px + q = r$ and $p(x + q) = r$
8	8.EE.C.7	Fluently solve linear equations and inequalities in one variable.
Algebra 1	A1.F-IF.C.7 A1.A-SSE.A.2	Graph functions expressed symbolically and show key features of the graph. Use structure to identify ways to rewrite numerical and polynomial expressions.
Geometry	G.G-SRT.B.5 G.G-GPE.B G.SRT.C.8	Use congruence and similarity criteria to prove relationships in geometric figures and solve problems utilizing a real-world context. Use coordinates to prove geometric theorems algebraically. Use trigonometric ratios (including inverse trigonometric ratios) and the Pythagorean Theorem to find unknown measurements in right triangles utilizing real-world context.
Algebra 2	A2.A-SSE.A.2 A2.F-BF.B A2.A-REI.B.4	Use the structure of an expression to identify ways to rewrite it. Build new functions from existing functions. Fluently solve quadratic equations in one variable.

Semester 1

Chapter 1: Ratios and Proportional Reasoning

Essential Question(s):

- How can you show that two objects are proportional?

Topic	Arizona Mathematics Standard	Mathematical Practices	Resources
Rates	<p>7.RP.2: Recognize and represent proportional relationships between quantities.</p> <p>7.RP.B.2: Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p>	<p>Glencoe Course 2: 1.1 Inquiry Lab</p> <p>Additional Resources: EngageNY: Grade 7, Mod 1, Topic A</p>
Complex Fractions & Unit Rates	<p>7.RP.1: Compute unit rates associated with ratios involving both simple and complex fractions, including ratios of quantities measured in like or different units.</p> <p>7.NS.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when $a, b, c,$ and d are all integers and $b, c,$ and $d \neq 0$.</p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 6</p>	<p>Glencoe Course 2: 1.2</p> <p>Additional Resource: CPM Course 2: 4.2.3</p> <p>Robert Kaplinsky: Motorcycle Speeding Ticket</p>
Convert Unit Rates	<p>7.RP.2: Recognize and represent proportional relationships between quantities.</p> <p>7.RP.3: Use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error)</p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p>	<p>Glencoe Course 2: 1.3</p> <p>Additional Resources: EngageNY: Grade 7, Mod 1, Topic C</p>

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Proportional and Nonproportional Relationships	<p>7.RP.2: Recognize and represent proportional relationships between quantities.</p> <p>7.RP.A.2: Decide whether two quantities are in a proportional relationship (e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin).</p> <p>7.RP.2b: Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</p>	MP 1 MP 3 MP 4	Glencoe Course 2: 1.4 Additional Resources: CPM Course 2: 4.2.4
Graph Proportional Relationships	<p>7.RP.2 Recognize and represent proportional relationships between quantities.</p> <p>7.RP.A.2: Decide whether two quantities are in a proportional relationship (e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin).</p>	MP 1 MP 2 MP 3 MP 4	Glencoe Course 2: 1.5 Inquiry Lab Additional Resources: CPM Course 2: 4.2.2
Solve Proportional Relationships	<p>7.RP.2: Recognize and represent proportional relationships between quantities.</p> <p>7.RP.B.2: Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</p> <p>7.RP.C.2: Represent proportional relationships by equations. <i>For 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 $t = pn$.</i></p> <p>7.RP.3: Use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error).</p>	MP 1 MP 2 MP 3 MP 4	Glencoe Course 2: 1.6
Constant Rate of Change	<p>7.RP.2: Recognize and represent proportional relationships between quantities.</p> <p>7.RP.B.2: Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</p> <p>7.RP.D.2: 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.</p>	MP 1 MP 3 MP 4	Glencoe Course 2: 1.7 Inquiry Lab

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Slope	7.RP.2: Recognize and represent proportional relationships between quantities.	MP 1	Glencoe Course 2: 1.8
	7.RP.B.2: Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	MP 3	
		MP 4	
Direct Variation	7.RP.2: Recognize and represent proportional relationships between quantities.	MP 1	Glencoe Course 2: 1.9
	7.RP.A.2: Decide whether two quantities are in a proportional relationship (e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin).	MP 2	
		MP 3	
	7.RP.B.2: Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	MP 4	

Semester 1

Chapter 2: Percents

Essential Question(s):

- How can percent help you understand situations involving money?

Topic	Arizona Mathematics Standard	Mathematical Practices	Resources
Percent of a Number	<p>7.RP.3: Use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error)</p> <p>7.EE.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 2.1 Inquiry Lab</p> <p>Additional Resources: Robert Kaplinsky: Paper Jam</p>
Percent of Estimation	<p>7.RP.3: Use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error)</p> <p>7.EE.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p>	<p>Glencoe Course 2: 2.2</p>
The Percent Proportion	<p>7.RP.3: Use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error)</p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 2.3 Inquiry Lab</p>

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<p>The Percent Equation</p>	<p>7.RP.2: Recognize and represent proportional relationships between quantities</p> <p>7.RP.C.2: Represent proportional relationships by equations. <i>For 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 $t = pn$.</i></p> <p>7.RP.3: Use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error)</p> <p>7.EE.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 2.4</p> <p>Additional Resources: EngageNY: Grade 7, Mod 4, topic B</p>
<p>Percent of Change</p>	<p>7.RP.3: Use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error)</p> <p>7.EE.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p> <p>MP 6</p>	<p>Glencoe Course 2: 2.5 Inquiry Lab</p> <p>Additional Resources: Estimation 180 Increasing and Decreasing Quantities by a Percent</p> <p>Robert Kaplinsky: Motel 6</p>

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<p>Sales Tax, Tips, and Markups</p>	<p>7.RP.3: Use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error)</p> <p>7.EE.2: Rewrite an expression in different forms, and understand the relationship between the different forms and their meanings in a problem context. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i></p> <p>7.EE.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 2.6</p>
<p>Discount</p>	<p>7.RP.3: Use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error)</p> <p>7.EE.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p>	<p>Glencoe Course 2: 2.7</p> <p>Additional Resources: Robert Kaplinsky: Bed, Bath, and Beyond</p> <p>Michael's Coupon</p> <p>Chinese Food</p>
<p>Financial Literacy: Simple Interest</p>	<p>7.RP.3: Use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error)</p> <p>7.EE.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 2.8 Inquiry Lab</p>

Semester 1

Chapter 3: Integers

Essential Question(s):

- What happens when you add, subtract, multiply, and divide integers?

Topic	Arizona Mathematics Standard	Mathematical Practices	Resources
Integers and Absolute Value	<p>7.NS.A.1: Add and subtract integers and other rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.</p> <p>a. Describe situations in which opposite quantities combine to make 0.</p> <p>b. Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world context.</p> <p>c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world context.</p>	MP 1 MP 3 MP 4 MP 5	<p>Glencoe Course 2: 3.1</p> <p>Additional Resources: Using Positive and Negative Numbers in Context</p>
Add Integers	<p>7.NS.A.1: Add and subtract integers and other rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.</p> <p>a. Describe situations in which opposite quantities combine to make 0.</p> <p>b. Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world context.</p> <p>d. Apply properties of operations as strategies to add and subtract rational numbers.</p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when a, b, c, and d are all integers and b, c, and $d \neq 0$.</p> <p>7.EE.B.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	MP 1 MP 3 MP 4 MP 7	<p>Glencoe Course 2: 3.2 Inquiry Lab</p> <p>Additional Resources: EngageNY: Grade 7, Mod 2, Topic A</p>

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<p>Subtract Integers</p>	<p>7.NS.A.1: Add and subtract integers and other rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.</p> <p>c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world context.</p> <p>d. Apply properties of operations as strategies to add and subtract rational numbers.</p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when a, b, c, and d are all integers and b, c, and $d \neq 0$.</p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p> <p>MP 6</p> <p>MP 7</p>	<p>Glencoe Course 2: 3.3 Inquiry Labs</p> <p>Additional Resources: CPM Course 2: 3.2.2</p> <p>EngageNY: Grade 7, Mod 2, Topic A</p> <p>Robert Kaplinsky: Temperature Drop</p>
<p>Multiply Integers</p>	<p>7.NS.A.2: Multiply and divide integers and other rational numbers.</p> <p>a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world context.</p> <p>c. Apply properties of operations as strategies to multiply and divide rational numbers.</p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when a, b, c, and d are all integers and b, c, and $d \neq 0$.</p> <p>7.EE.B.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 8</p>	<p>Glencoe Course 2: 3.4 Inquiry Labs</p> <p>Additional Resources: EngageNY: Grade 7, Mod 2, Topic B</p>

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<p>Divide Integers</p>	<p>7.NS.A.2: Multiply and divide integers and other rational numbers.</p> <p>b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world context.</p> <p>c. Apply properties of operations as strategies to multiply and divide rational numbers.</p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when a, b, c, and d are all integers and b, c, and $d \neq 0$.</p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p> <p>MP 7</p>	<p>Glencoe Course 2: 3.5</p> <p>Additional Resources: CPM Course 2: 3.2.5 and 3.3.1</p> <p>EngageNY: Grade 7, Mod 2, Topic B</p>
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Semester 1

Chapter 4: Rational Numbers

Essential Question(s):

- What happens when you add, subtract, multiply, and divide fractions?

Topic	Arizona Mathematics Standard	Mathematical Practices	Resources
Terminating and Repeating Decimals	<p>7NS.2: Multiply and divide integers and other rational numbers.</p> <p>d. Convert a rational number to decimal form using long division; know that the decimal form of a rational number terminates in 0's or eventually repeats.</p> <p>7.EE.B.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 6</p> <p>MP 7</p>	<p>Glencoe Course 2: 4.1 Inquiry Lab</p> <p>Additional Resources: CPM Course 2: 3.2.4 and 3.3.2</p>
Compare and Order Rational Numbers	<p>7.NS.2: Multiply and divide integers and other rational numbers.</p> <p>b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world context.</p> <p>7.EE.B.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 4.2</p>

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<p>Add and Subtract Like Fractions</p>	<p>7NS.A.1: Add and subtract integers and other rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.</p> <p>c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world context.</p> <p>d. Apply properties of operations as strategies to add and subtract rational numbers.</p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when a, b, c, and d are all integers and b, c, and $d \neq 0$.</p> <p>7.EE.B.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 7</p>	<p>Glencoe Course 2: 4.3 Inquiry Lab</p> <p>Additional Resources: CPM Course 2: 2.2.2</p>
<p>Add and Subtract Unlike Fractions</p>	<p>7NS.A.1: Add and subtract integers and other rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.</p> <p>d. Apply properties of operations as strategies to add and subtract rational numbers.</p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when a, b, c, and d are all integers and b, c, and $d \neq 0$.</p> <p>7.EE.B.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 4.4</p>

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<p>Add and Subtract Mixed Numbers</p>	<p>7.NS.A.1: Add and subtract integers and other rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.</p> <p>d. Apply properties of operations as strategies to add and subtract rational numbers.</p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when a, b, c, and d are all integers and b, c, and $d \neq 0$.</p> <p>7.EE.B.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 4.5</p>
<p>Multiply Fractions</p>	<p>7.NS.2: Multiply and divide integers and other rational numbers.</p> <p>a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world context.</p> <p>c. Apply properties of operations as strategies to multiply and divide rational numbers.</p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when a, b, c, and d are all integers and b, c, and $d \neq 0$.</p> <p>7.EE.B.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 4.6</p> <p>Additional Resources: CPM Course 2: 2.2.6</p>

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<p>Convert Between Systems</p>	<p>7.NS.2: Multiply and divide integers and other rational numbers.</p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when a, b, c, and d are all integers and b, c, and $d \neq 0$.</p> <p>7.RP.A.3: Use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error).</p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p> <p>MP 6</p>	<p>Glencoe Course 2: 4.7</p>
<p>Divide Fractions</p>	<p>7.NS.2: Multiply and divide integers and other rational numbers.</p> <p>c. Apply properties of operations as strategies to multiply and divide rational numbers.</p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when a, b, c, and d are all integers and b, c, and $d \neq 0$.</p> <p>7.EE.B.3: Solve multi-step mathematical problems and problems in real-world context posed with positive and negative rational numbers in any form. Convert between forms as appropriate and assess the reasonableness of answers. <i>For 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 per hour.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p>	<p>Glencoe Course 2: 4.8</p>

Semester 2

Chapter 5: Expressions

Essential Question(s):

- **How can you use numbers and symbols to represent mathematical ideas?**

Topic	Arizona Mathematics Standard	Mathematical Practices	Resources
Algebraic Expressions	<p>7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p> <p>7.EE.2: Rewrite an expression in different forms, and understand the relationship between the different forms and their meanings in a problem context. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i></p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when $a, b, c,$ and d are all integers and $b, c,$ and $d \neq 0$.</p>	MP 1 MP 2 MP 3 MP 4	<p>Glencoe Course 2: 5.1</p> <p>Additional Resources: CPM Course 2: 6.1.1</p>
Sequences	<p>7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p> <p>7.EE.2: Rewrite an expression in different forms, and understand the relationship between the different forms and their meanings in a problem context. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i></p>	MP 1 MP 2 MP 3 MP 4	<p>Glencoe Course 2: 5.2 Inquiry Lab</p>
Properties of Operations	<p>7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p> <p>7.EE.2: Rewrite an expression in different forms, and understand the relationship between the different forms and their meanings in a problem context. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i></p>	MP 1 MP 3 MP 4 MP 5 MP 7	<p>Glencoe Course 2: 5.3</p> <p>Additional Resources: CPM Course 2: 3.3.3</p> <p>EngageNY Grade 7, Mod 3, Topic A</p>

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<p>The Distributive Property</p>	<p>7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p> <p>7.EE.2: Rewrite an expression in different forms, and understand the relationship between the different forms and their meanings in a problem context. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p> <p>MP 7</p>	<p>Glencoe Course 2: 5.4</p> <p>Additional Resources: CPM Course 2: 4.3.2, 4.3.3, and 6.2.2</p>
<p>Simplifying Expressions</p>	<p>7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p> <p>7.EE.2: Rewrite an expression in different forms, and understand the relationship between the different forms and their meanings in a problem context. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i></p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p> <p>MP 6</p>	<p>Glencoe Course 2: 5.5</p> <p>Additional Resources: CPM Course 2: 4.3.1</p>
<p>Add Linear Expressions</p>	<p>7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p> <p>7.EE.2: Rewrite an expression in different forms, and understand the relationship between the different forms and their meanings in a problem context. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i></p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when $a, b, c,$ and d are all integers and $b, c,$ and $d \neq 0$.</p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 5.6</p>

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<p>Subtract Linear Expressions</p>	<p>7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p> <p>7.EE.2: Rewrite an expression in different forms, and understand the relationship between the different forms and their meanings in a problem context. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i></p> <p>7.NS.A.3: Solve mathematical problems and problems in real-world context involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions where $a/b \div c/d$ when $a, b, c,$ and d are all integers and $b, c,$ and $d \neq 0$.</p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 5.7</p>
<p>Factor Linear Expressions</p>	<p>7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.</p> <p>7.EE.2: Rewrite an expression in different forms, and understand the relationship between the different forms and their meanings in a problem context. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i></p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 5.8 Inquiry Lab</p> <p>Additional Resources: Robert Kaplinsky: Hot Dogs and Buns</p>

Semester 2

Chapter 6: Equations and Inequalities

Essential Question(s):

- **What does it mean to say two quantities are equal?**

Topic	Arizona Mathematics Standard	Mathematical Practices	Resources
Solve One-Step Addition and Subtraction Equations	<p>7.EE.B.4: Use variables to represent quantities in mathematical problems and problems in real-world context, and construct simple equations and inequalities to solve problems.</p> <p>7.EE.B.4a: 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. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.</p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p>	<p>Glencoe Course 2: 6.1 Inquiry Lab</p> <p>Additional Resources: EngageNY: Grade 7, Mod 3, Topic B</p>
Multiplication and Division Equations	<p>7.EE.B.4: Use variables to represent quantities in mathematical problems and problems in real-world context, and construct simple equations and inequalities to solve problems.</p> <p>7.EE.B.4a: 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. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.</p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p> <p>MP 7</p>	<p>Glencoe Course 2: 6.2 Inquiry Lab</p>
Solve Equations with Rational Coefficients	<p>7.EE.B.4: Use variables to represent quantities in mathematical problems and problems in real-world context, and construct simple equations and inequalities to solve problems.</p> <p>7.EE.B.4a: 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. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.</p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 6.3 Inquiry Lab</p>

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Solve Two-Step Equations	<p>7.EE.B.4: Use variables to represent quantities in mathematical problems and problems in real-world context, and construct simple equations and inequalities to solve problems.</p> <p>7.EE.B.4a: 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. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.</p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p>	Glencoe Course 2: 6.4 & 6.5 Inquiry Labs
Solve Inequalities by Addition or Subtraction	<p>7.EE.B.4: Use variables to represent quantities in mathematical problems and problems in real-world context, and construct simple equations and inequalities to solve problems.</p> <p>7.EE.B.4b: Solve word problems leading to inequalities of the form $px+q > r$ or $px+q < r$, where p, q, and r are rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.</p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 6.6 Inquiry Lab</p> <p>Additional Resources: CPM Course 2: 6.1.3 and 6.1.4</p>
Solve Inequalities by Multiplication or Division	<p>7.EE.B.4: Use variables to represent quantities in mathematical problems and problems in real-world context, and construct simple equations and inequalities to solve problems.</p> <p>7.EE.B.4b: Solve word problems leading to inequalities of the form $px+q > r$ or $px+q < r$, where p, q, and r are rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.</p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p> <p>MP 7</p>	<p>Course 2: 6.7</p> <p>Additional Resources: CPM Course 2: 6.1.3 and 6.1.4</p>
Solve Two-Step Inequalities	<p>7.EE.B.4: Use variables to represent quantities in mathematical problems and problems in real-world context, and construct simple equations and inequalities to solve problems.</p> <p>7.EE.B.4b: Solve word problems leading to inequalities of the form $px+q > r$ or $px+q < r$, where p, q, and r are rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.</p>	<p>MP 1</p> <p>MP 2</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p>	Glencoe Course 2: 6.8

Semester 2

Chapter 7: Geometric Figures

Essential Question(s):

- **How does geometry help us describe real-world objects?**

Topic	Arizona Mathematics Standard	Mathematical Practices	Resources
Classify Angles	7.G.B.5: Use facts about supplementary, complementary, vertical, and adjacent angles in multi-step problems to write and solve simple equations for an unknown angle in a figure	MP 1 MP 3 MP 4 MP 7	Glencoe Course 2: 7.1 Additional Resources: EngageNY: Grade 7, Mod 6, Topic A How do you classify triangles?
Complementary & Supplementary Angles	7.G.B.5: Use facts about supplementary, complementary, vertical, and adjacent angles in multi-step problems to write and solve simple equations for an unknown angle in a figure.	MP 1 MP 3 MP 4 MP 7	Glencoe Course 2: 7.2
Triangles	7.G.A.2: Draw geometric shapes with given conditions using a variety of methods. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	MP 1 MP 2 MP 3 MP 4	Glencoe Course 2: 7.3 Inquiry Labs Additional Resources: EngageNY: Grade 7, Mod 6, Topic B

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Scale drawings	7.G.A.1: Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	MP 1 MP 2 MP 3 MP 4 MP 5	Glencoe Course 2: 7.4 Inquiry Labs Additional resources: CPM Course 2: 4.1.2 EngageNY: Grade 7, Mod 1, Topic D What is scale drawing? Robert Kaplinsky: Zoolander's School
Drawing 3D Figures	7.G.A.3: Describe the two-dimensional figures that result from slicing three-dimensional figures.	MP 1 MP 3 MP 4	Glencoe Course 2: 7.5
Cross Sections	7.G.A.3: Describe the two-dimensional figures that result from slicing three-dimensional figures.	MP 1 MP 3 MP 4	Glencoe Course 2: 7.6 Additional Resources: Visual of cross sections Math is Fun cross sections

Semester 2

Chapter 8: Measure Figures

Essential Question(s):

- **How do measurements help you describe real-world objects?**

Topic	Arizona Mathematics Standard	Mathematical Practices	Resources
Circumference	7.G.B.4: Understand and use the formulas for the area and circumference of a circle to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	MP 1 MP 3 MP 4 MP 6 MP 8	Glencoe Course 2: 8.1 Inquiry Lab Additional Resources: CPM Course 2: 9.1.1 Robert Kaplinsky: Purple Ribbon
Area of Circles	7.G.B.4: Understand and use the formulas for the area and circumference of a circle to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	MP 1 MP 3 MP 4	Glencoe Course 2: 8.2 Inquiry Lab Additional Resources: CPM course 2: 9.1.2 Finding Areas of Circles
Area of Composite Figures	7.G.B.4: Understand and use the formulas for the area and circumference of a circle to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. 7.G.B.6: Solve mathematical problems and problems in a real-world context involving area of two-dimensional objects composed of triangles, quadrilaterals, and other polygons. Solve mathematical problems and problems in real-world context involving volume and surface area of three-dimensional objects composed of cubes and right prisms.	MP 1 MP 2 MP 3 MP 4	Glencoe Courses 2: 8.3 Additional Resources: CPM Course 2: 9.1.3 EngageNY: Grade 7, Mod 6, Topic D

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Volume of Prisms	7.G.B.6: Solve mathematical problems and problems in a real-world context involving area of two-dimensional objects composed of triangles, quadrilaterals, and other polygons. Solve mathematical problems and problems in real-world context involving volume and surface area of three-dimensional objects composed of cubes and right prisms.	MP 1 MP 2 MP 3 MP 4	Glencoe Course 2: 4.4 Additional Resources: CPM Course 2: 9.2.3 EngageNY: Grade 7, Mod 6, Topic E Robert Kaplinsky: How much money
Volume of Pyramids	7.G.B.6: Solve mathematical problems and problems in a real-world context involving area of two-dimensional objects composed of triangles, quadrilaterals, and other polygons. Solve mathematical problems and problems in real-world context involving volume and surface area of three-dimensional objects composed of cubes and right prisms.	MP 1 MP 3 MP 4 MP 6	Glencoe Course 2: 8.5 Inquiry Lab Additional Resources: EngageNY: Grade 7, Mod 6, Topic E
Surface Area of Prisms	7.G.B.6: Solve mathematical problems and problems in a real-world context involving area of two-dimensional objects composed of triangles, quadrilaterals, and other polygons. Solve mathematical problems and problems in real-world context involving volume and surface area of three-dimensional objects composed of cubes and right prisms.	MP 1 MP 3 MP 4 MP 6	Glencoe Course 2: 8.6 Inquiry Labs
Surface Area of Pyramids	7.G.B.6: Solve mathematical problems and problems in a real-world context involving area of two-dimensional objects composed of triangles, quadrilaterals, and other polygons. Solve mathematical problems and problems in real-world context involving volume and surface area of three-dimensional objects composed of cubes and right prisms.	MP 1 MP 3 MP 4	Glencoe Course 2: 8.7
Volume and Surface Area of Composite Figures	7.G.B.6: Solve mathematical problems and problems in a real-world context involving area of two-dimensional objects composed of triangles, quadrilaterals, and other polygons. Solve mathematical problems and problems in real-world context involving volume and surface area of three-dimensional objects composed of cubes and right prisms.	MP 1 MP 3 MP 4	Glencoe Course 2: 8.8 Inquiry Lab Additional Resources: CPM Course 2: 9.2.1 Robert Kaplinsky: Foil Prank

Semester 2

Chapter 9: Probability

Essential Question(s):

- **How can you predict the outcome of future events?**

Topic	Arizona Mathematics Standard	Mathematical Practices	Resources
Probability of Simple Events	<p>7.SP.C.5: Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. 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.</p> <p>7.SP.C.7a: Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. <i>For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</i></p>	MP 1 MP 3 MP 4	<p>Glencoe Course 2: 9.1</p> <p>Additional Resources: CPM Course 2: 5.2.1</p> <p>Engage Ny: Grade 7, Mod 5, Topic A</p> <p>Math is Fun: probability</p>
Relative Frequency	<p>7.SP.C.6: 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. <i>For 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.</i></p> <p>7.SP.C.7a: Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. <i>For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected</i></p>	MP 1 MP 3	Glencoe Course 2: Inquiry Lab

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Theoretical and Experimental Probability	<p>7.SP.7: Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies. If the agreement is not good, explain possible sources of the discrepancy.</p> <p>7.SP.C.7a: Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. <i>For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</i></p> <p>7.SP.C.7b: Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. <i>For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</i></p>	MP 1 MP 3 MP 4	Glencoe Course 2: 9.2
Fundamental Counting Principle	<p>7.SP.C.5: Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. 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.</p> <p>7.SP.C.7: Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies. If the agreement is not good, explain possible sources of the discrepancy.</p> <p>a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. <i>For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</i></p> <p>b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. <i>For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</i></p>	MP 1 MP 3 MP 4	<p>Glencoe: 9.5</p> <p>Additional Resources: Robert Kaplinsky: Video Poker</p>
Probability of Compound Events, Simulations, Permutations, and Independent and Dependent Events	**Optional: These are 8 th grade standards	MP 1 MP 3 MP 4	<p>Glencoe Courses 2: 9.3, 9.4, 9.6, and 9.7</p> <p>Optional: this is an eighth-grade standard</p>

Semester 2

Chapter 10: Statistics

Essential Question(s):

- **How do you know which type of graph to use when displaying data?**

Topic	Arizona Mathematics Standard	Mathematical Practices	Resources
Make Predictions	<p>7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.</p> <p>7.SP.A. 2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. <i>For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 10.1</p> <p>Additional Resources: Robert Kaplinsky: Chip Bags</p>
Unbiased and Biased Samples	<p>7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.</p> <p>7.SP.A. 2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. <i>For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</i></p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p> <p>MP 5</p>	<p>Glencoe Course 2: 10.2 Inquiry Lab</p> <p>Additional Resources: CPM Course 2: 8.2.2 EngageNY: Grade 7, Mod 5, Topic C</p>
Misleading Graphs and Statistics	<p>7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.</p>	<p>MP 1</p> <p>MP 3</p> <p>MP 4</p>	<p>Glencoe Course 2: 10.3</p>

Mathematics – Seventh Grade

Compare Populations	7.SP. 4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. <i>For example, 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.</i>	MP 1 MP 3 MP 4 MP 6	Glencoe Course 2: 10.4 Inquiry Labs Additional Resource: EngageNY: Grade 7, Mod 5, Topic D
Select an Appropriate Display	7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	MP 1 MP 3 MP 4	Glencoe Course 2: 10.5

Mathematics – Seventh Grade
The Mathematical Practices: Narratives and Questions

Mathematics Practices		Narratives	Related Questions
Overarching habits of mind of a productive math thinker	7.MP.1 Make sense of problems and persevere in solving them	Mathematically proficient students explain to themselves the meaning of a problem, look for entry points to begin work on the problem, and plan and choose a solution pathway. While engaging in productive struggle to solve a problem, they continually ask themselves, “Does this make sense?” to monitor and evaluate their progress and change course if necessary. Once they have a solution, they look back at the problem to determine if the solution is reasonable and accurate. Mathematically proficient students check their solutions to problems using different methods, approaches, or representations. They also compare and understand different representations of problems and different solution pathways, both their own and those of others.	<ul style="list-style-type: none"> • How would you describe the problem in your own words? • How would you describe what you are trying to find? • What do you notice about...? • What information is given in the problem? • Describe the relationship between the quantities. • Describe what you have already tried. What might you change? • Talk me through the steps you’ve used to this point. • What steps in the process are you most confident about? • What are some other strategies you might try? • What are some other problems that are similar to this one? • How might you use one of your previous problems to help you begin? • How else might you organize...represent... show...?
	7.MP.6 Attend to precision	Mathematically proficient students clearly communicate to others using appropriate mathematical terminology, and craft explanations that convey their reasoning. When making mathematical arguments about a solution, strategy, or conjecture, they describe mathematical relationships and connect their words clearly to their representations. Mathematically proficient students understand meanings of symbols used in mathematics, calculate accurately and efficiently, label quantities appropriately, and record their work clearly and concisely.	<ul style="list-style-type: none"> • What mathematical terms apply in this situation? • How did you know your solution was reasonable? • Explain how you might show that your solution answers the problem. • What would be a more efficient strategy? • How are you showing the meaning of the quantities? • What symbols or mathematical notations are important in this problem? • What mathematical language..., definitions..., properties can you use to explain...? • How could you test your solution to see if it answers the problem?

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Mathematics – Seventh Grade
The Mathematical Practices: Narratives and Questions

Mathematics Practices		Narratives	Related Questions
Reasoning and Explaining	7.MP.2 Reason abstractly and quantitatively	Mathematically proficient students make sense of quantities and their relationships in problem situations. Students can contextualize and decontextualize problems involving quantitative relationships. They contextualize quantities, operations, and expressions by describing a corresponding situation. They decontextualize a situation by representing it symbolically. As they manipulate the symbols, they can pause as needed to access the meaning of the numbers, the units, and the operations that the symbols represent. Mathematically proficient students know and flexibly use different properties of operations, numbers, and geometric objects and when appropriate they interpret their solution in terms of the context.	<ul style="list-style-type: none"> • What do the numbers used in the problem represent? • What is the relationship of the quantities? • How is _____ related to _____? • What is the relationship between _____ and _____? • What does _____ mean to you? (e.g. symbol, quantity, diagram) • What properties might we use to find a solution? • How did you decide in this task that you needed to use...? • Could we have used another operation or property to solve this task? Why or why not?
	7.MP.3 Construct viable arguments and critique the reasoning of others	Mathematically proficient students construct mathematical arguments (explain the reasoning underlying a strategy, solution, or conjecture) using concrete, pictorial, or symbolic referents. Arguments may also rely on definitions, assumptions, previously established results, properties, or structures. Mathematically proficient students make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. Mathematically proficient students present their arguments in the form of representations, actions on those representations, and explanations in words (oral or written). Students critique others by affirming or questioning the reasoning of others. They can listen to or read the reasoning of others, decide whether it makes sense, ask questions to clarify or improve the reasoning, and validate or build on it. Mathematically proficient students can communicate their arguments, compare them to others, and reconsider their own arguments in response to the critiques of others.	<ul style="list-style-type: none"> • What mathematical evidence would support your solution? • How can we be sure that...? / How could you prove that...? • Will it still work if...? • What were you considering when...? • How did you decide to try that strategy? • How did you test whether your approach worked? • How did you decide what the problem was asking you to find? • Did you try a method that did not work? Why didn't it work? Could it work? • What is the same and what is different about...? • How could you demonstrate a counter-example?

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Mathematics – Seventh Grade
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Mathematics Practices		Narratives	Related Questions
Modeling and Using Tools	7.MP.4 Model with mathematics	Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. When given a problem in a contextual situation, they identify the mathematical elements of a situation and create a mathematical model that represents those mathematical elements and the relationships among them. Mathematically proficient students use their model to analyze the relationships and draw conclusions. They interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.	<ul style="list-style-type: none"> • What number model could you construct to represent the problem? • What are some ways to represent the quantities? • What is an equation or expression that matches the diagram, number line, chart, table, and your actions with the manipulatives? • Where did you see one of the quantities in the task in your equation or expression? What does each number in the equation mean? • How would it help to create a diagram, graph, table...? • What are some ways to visually represent...? • What formula might apply in this situation?
	7.MP.5 Use appropriate tools strategically	Mathematically proficient students consider available tools when solving a mathematical problem. They choose tools that are relevant and useful to the problem at hand. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful; recognizing both the insight to be gained and their limitations. Students deepen their understanding of mathematical concepts when using tools to visualize, explore, compare, communicate, make and test predictions, and understand the thinking of others.	<ul style="list-style-type: none"> • What mathematical tools can we use to visualize and represent the situation? • Which tool is more efficient? Why do you think so? • What information do you have? • What do you know that is not stated in the problem? • What approach are you considering trying first? • What estimate did you make for the solution? • In this situation would it be helpful to use...a graph..., number line..., ruler..., diagram..., calculator..., manipulative? • Why was it helpful to use...? • What can using a _____ show us that _____ may not? • In what situations might it be more informative or helpful to use...?

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Mathematics Practices		Narratives	Related Questions
Seeing structure and generalizing	7.MP.7 Look for and make use of structure	Mathematically proficient students use structure and patterns to assist in making connections among mathematical ideas or concepts when making sense of mathematics. Students recognize and apply general mathematical rules to complex situations. They are able to compose and decompose mathematical ideas and notations into familiar relationships. Mathematically proficient students manage their own progress, stepping back for an overview and shifting perspective when needed.	<ul style="list-style-type: none"> • What observations do you make about...? • What do you notice when...? • What parts of the problem might you eliminate..., simplify...? • What patterns do you find in...? • How do you know if something is a pattern? • What ideas that we have learned before were useful in solving this problem? • What are some other problems that are similar to this one? • How does this relate to...? • In what ways does this problem connect to other mathematical concepts?
	7.MP.8 Look for and express regularity in repeated reasoning	Mathematically proficient students look for and describe regularities as they solve multiple related problems. They formulate conjectures about what they notice and communicate observations with precision. While solving problems, students maintain oversight of the process and continually evaluate the reasonableness of their results. This informs and strengthens their understanding of the structure of mathematics which leads to fluency.	<ul style="list-style-type: none"> • Explain how this strategy works in other situations? • Is this always true, sometimes true or never true? • How would we prove that...? • What do you notice about...? • What is happening in this situation? • What would happen if...? • Is there a mathematical rule for...? • What predictions or generalizations can this pattern support? • What mathematical consistencies do you notice?

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