Hainesport Township School District
211 Broad Street Hainesport, NJ 08036

Course Title: Pre-Algebra Math Grade 7
Board of Education Adoption Date: January, 2017
Board of Education Re-adoption Date: 8/28/2018, 1/2/2024

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Course Description and Concepts

PRE-ALGEBRA – This course is offered to 7th grade students who have shown the ability to reason and analyze concepts at high-level of thinking such as synthesizing information. Some concepts taught are: integers, decimals, fractions, solving equations and inequalities, percents, coordinate system, functions and equations, probability, and geometry. Group and hands-on activities are incorporated throughout the year as the teacher facilitates the lessons rather than direct teaching. Pre-Algebra closely follows the Mathematics 8 curriculum. Consequently, those students that participate in Pre-Algebra and subsequently do not meet the prerequisites for Algebra will repeat much of the math curriculum in 8th grade to ensure mastery of these skills.

Pre-Algebra Placement Criteria

To be considered for Pre-Algebra, students must earn at least 5 out of 8 possible points based upon the following criteria:

CRITERIA		SCORE RANGE	POINTS EARNED
*Points earned for this criteria based on previous year's placement.	**MATH 6 FINAL GRADE AVERAGE**	96-100%	1 point
		Less than 96%	0 points
	ADVANCED MATH 6 FINAL GRADE AVERAGE	96%-100%	2 points
		90%-95%	1 point
		Less than 90%	0 points
MATHEMATICS PARCC SCORE		Level 5	2 points
		Level 4	1 point
		Levels 1 - 3	0 points
MATHEMATICS READINESS ASSESSMENT		90-100%	2 points
		80-89%	1 point
		Less than 80%	0 points
		85-100%	2 points

MATHEMATICS BENCHMARK ASSESSMENT SCORE AVERAGE	70-84%	1 point
	Less than 70%	0 points

New Jersey Student Learning Standards Math

New Jersey Student Learning Standards for Mathematics

NJ Technology Standards

8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

8.2 Technology Education, Engineering, Design and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

Career Ready Practices

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

http://www.state.nj.us/education/cccs/2014/career/CareerReadyPractices.pdf

Pacing Guide

Unit Topic	Unit #	APX Unit Length
Numbers & Operations	I	5 weeks (23 days)
Ratios & Proportions Percents	II	4 weeks (18 days)
Expressions Equations & Inequalities	III	6 Weeks (25.5 days)
Geometry	IV	8 weeks (41 days)

Statistics & Probability	V	2 weeks (10 days)
Graphing Linear Equations	VI	8 weeks (38 days)

Pre-Algebra Math 7 Curriculum **Unit 1 (2 Parts)**	
Title: Numbers & Operations	
Subject: Pre-Algebra Math 7	**Length of Time:** 5 weeks (23 days)
Unit 1 Summary: Unit 1 Part 1 will allow students to further their understanding of the number system. They will explore rational numbers and perform numerous operations using them. They will add, subtract, multiply, and divide rational numbers when solving equations. They will also extend their knowledge of rational numbers to decimals and real world applications. Unit 1 Part 2 will then allow students to evaluate squares and radicals. They will explore how to simplify and approximate square roots to help solve expressions. The chapter will also introduce different properties of exponents and solving equations using them. These skills will be necessary when solving problems involving Pythagorean Theorem or exponential notations.	

Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ○ Additional Clusters	
Standard #s:	**Standards:**
7.NS.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. d. Apply properties of operations as strategies to add and subtract rational numbers.(Part 2)
7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. c. Apply properties of operations as strategies to multiply and divide rational numbers (Part 2)
7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions.
8.NS.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).
8.EE.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.
Technology 8.1.8.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
Technology 8.1.8.D.4	Assess the credibility and accuracy of digital content
Technology 8.2.8.C.1	Explain how different teams/groups can contribute to the overall design of a product.
Technology 8.2.8.C.2	Explain the need for optimization in a design process.
Standard#:	**Standard:**

MP1	Making sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.

Modifications

Standards-based grading, reassessments, differentiate assignments, scaffold instruction, study guides, peer/teacher tutoring assistance, tiered assignments, student choice, modify pace, lesson tutorial videos, performance assessments, modified rubrics, assessment modified for IDEA, add enrichment activities, add extension activities to projects, challenge activities

Interdisciplinary Connections

Science, Language Arts, and Technology

Integration of 21st Century Themes and Skills

21st Century Skills

- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Themes

- Critical Thinking and Problem Solving
- Communication and Collaboration

· Life and Career Skills

Pre-Algebra Math 7 Curriculum **Unit 1 Part 1**	
Title: Numbers & Operations	
Subject: Pre-Algebra Math 7	**Length of Time:** 3 weeks (14 days)
Unit 1 Part 1 Summary: Unit 1 Part 1 will allow students to further their understanding of the number system. They will explore rational numbers and perform numerous operations using them. They will add, subtract, multiply, and divide rational numbers when solving equations. They will also extend their knowledge of rational numbers to decimals and real world applications.	
Learning Targets	
PARCC ■ Major Clusters; ◘ Supporting Clusters; ○ Additional Clusters	
Domain: The Number System	
Cluster: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers	
Standard #s:	**Standards:**
7.NS.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions.
Unit 1 Part 1 Essential Question: · How do operations affect rational numbers? · How can we use rational numbers to solve real world application problems?	**Unit 1 Part 1 Enduring Understandings:** · Previous understanding of operations of numbers can be directly applied to rational numbers. · Rational numbers can be used to solve real word problems.

Unit 1 Part 1 Objectives:

- Students will be applying their prior knowledge of the number system to problems involving rational numbers.
- Students will be able to add, subtract, multiply and divide rational numbers.
- Students will transform rational numbers into decimals.
- Students will solve real world problems using rational numbers.

Evidence of Learning

Formative Assessments:

- Questioning strategies used throughout the unit.
- 5 Quizzes

Summative Assessment:

- Cumulative Assessment

Pacing Guide

Topics	Timeframe
Topic #1: Addition, Natural Numbers & Whole Numbers	0.5 day
Topic #2: Addition, Subtraction and Integers (Absolute Value 1.4 in HM textbook) Lab: RAFT – The Absolutely Valuable Game **Quiz #1**	1.5 days
Topic #3: Addition and Subtraction of Integers (1.5 and 1.6 in HM textbook) **Quiz #2**	2 days
Topic #4: Multiplication and Division of Integers (1.7 in HM textbook) **Quiz #3**	2 days
Topic #5: Operations with Rational Numbers	0.5 day
Topic #6: Addition and Subtraction of Rational Numbers (5.2 and 5.3 in HM textbook) Lab: RAFT – Fraction Action Game	1.5 days
Topic #7: Adding and Subtracting Rational Numbers Review Lab: RAFT – Above and Below Zero Game Lab: RAFT – Graphing Race to the Edge	1 days

Quiz #4	
Topic #8: Multiplication and Division of Rational Numbers (5.4 and 5.5 in HM textbook) **Quiz #5**	2 days
Topic #9: Converting Rational Numbers to Decimals (5.1 in HM textbook)	1 days
Review and Cumulative Assessment	2 days

Curriculum Resources:

- https://njctl.org/courses/math/7th-grade/
- http://www.raftbayarea.org/ideas/Fraction%20Action%20Game.pdf
- http://www.raftbayarea.org/ideas/Absolutely%20Valuable%20Game.pdf
- http://www.raftbayarea.org/ideas/Above%20and%20Below%20Zero%20Game.pdf
- HYPERLINK "http://www.raftbayarea.org/ideas/Graphing%20Race%20to%20the%20Edge.pdf" http://www.raftbayarea.org/ideas/Graphing%20Race%20to%20the%20Edge.pdf

Pre-Algebra Math 7 Curriculum **Unit 1 Part 2**	
Title: Numbers and Operations	
Subject: Pre-Algebra Math 7	**Length of Time:** 2 weeks (9 days)
Unit 1 Part 2 Summary: Unit 1 Part 2 will then allow students to evaluate squares and radicals. They will explore how to simplify and approximate square roots to help solve expressions. The chapter will also introduce different properties of exponents and solving equations using them. These skills will be necessary when solving problems involving Pythagorean Theorem or exponential notations.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ○ Additional Clusters	

Domain: The Number System	
Cluster: Know that there are numbers that are not rational, and approximate them by rational numbers.	
Standard #s:	**Standards:**
8.NS.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).
Domain: Expressions and Equations	
Cluster: Expressions and Equations work with radicals and integer exponents.	
Standard #s:	**Standards:**
8.EE.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.

Unit 1 Part 2 Essential Question: ● What is the difference between rational and irrational numbers?	**Unit 1 Part 2 Enduring Understanding:** ● Squares and Radicals can help solve real world problems. ● Squares and Radicals affect the numbers that are being used within an operation.

Unit 1 Part 2 Objectives:

- Students will be able to find the squares and square roots of both rational and irrational numbers.
- Students will know the perfect squares. They will also be able to simplify perfect square radical expressions as well as non-perfect square radicands.
- Students will use the perfect squares to approximate square roots.
- Students will understand the properties of exponents and will use them to solve equations with perfect square and cube roots.

Evidence of Learning

Formative Assessments:

• SMART Response questions used throughout the chapter. • 3 Quizzes
Summative Assessment: • Cumulative Assessment

Lesson Plan	
Topics	**Timeframe**
Presentation Part 1	
Topic #1: Exponents, Squares, Square Roots and Perfect Squares (9.1 in HM textbook) *Activity: A Penny for Your Thoughts* **Quiz #1 (Find by topic)**	1 days
Presentation Part 2	
Topic #2: Squares of Numbers Greater than 20	1 day
Topic #3: Simplifying Perfect Square Radical Expressions (9.2 in HM textbook) **Quiz #2 (Find by topic)**	1 day
Topic #4: Approximating Square Roots (Focus on Operations 9.4 Approximating Rational Numbers in HM textbook) *Activity: Root Race*	1 day
Topic #5: Rational & Irrational Numbers **Quiz #4**	1 day
Topic #6: Real Numbers	1 day
Topic #7: Properties of Exponents (4.5 in HM textbook) *Activity: Laws of Exponents* **Quiz #3 (Find by topic)**	2 days
Review and Cumulative Assessment	1 day

Curriculum Development Resources:

- Textbook and online resources
- http://njctl.org/courses/math/8th-grade-math/ HYPERLINK "http://njctl.org/courses/math/8th-grade-math/"

Pre-Algebra Math 7 Curriculum **Unit 2 (2 Parts)**	
Title: Ratios, Proportional Relationships, and Percents	
Subject: Pre-Algebra Math 7	**Length of Time:** 4 weeks (18 days)
Unit 2 Summary: Unit 2 Part 1 will give students the opportunity to analyze proportional relationships to solve ratios, proportions, and real-world math problems. Unit 2 Part 2 will introduce students to percents. They will learn the different types of percent problems and how to represent the percent equations algebraically. They will also learn how to solve real world application problems involving percents.	
Learning Targets	
PARCC ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters	
Standard#:	**Standard:**
7.RP.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
7.RP.2	Recognize and represent proportional relationships between quantities. a. 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. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

	c. Represent proportional relationships by equations. *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*. d. 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.
7.RP.3	Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.
7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.
7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
7.G.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
Technology 8.2.8.C.4	Identify the steps in the design process that would be used to solve a designated problem.
Technology 8.2.8.C.5a	Create a technical sketch of a product with materials and measurements labeled.
Domain: Standards for Math Practice	
Standard#:	**Standard:**
MP1	Making sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically

MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.

Modifications
Standards-based grading, reassessments, differentiate assignments, scaffold instruction, study guides, peer/teacher tutoring assistance, tiered assignments, student choice, modify pace, lesson tutorial videos, performance assessments, modified rubrics, assessment modified for IDEA, add enrichment activities, add extension activities to projects, challenge activities
Interdisciplinary Connections
Science, Language Arts, Social Studies, Art, and Technology
Integration of 21st Century Themes and Skills
21st Century Skills ● Financial, Economic, Business, and Entrepreneurial Literacy **21st Century Themes** ● Critical Thinking and Problem Solving ● Communication and Collaboration ● Life and Career Skills

Pre-Algebra Math 7 **Unit 2 Part 1**
Title: Ratios & Proportions

Subject: Pre-Algebra Math 7	**Length of Time:** 2 weeks (10 days)
Unit 2 Part 1 Summary: Unit 2 Part 1 will give students the opportunity to analyze proportional relationships to solve ratios, proportions, and real-world math problems.	
Learning Targets	
PARCC ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters	
Domain: Ratios and Proportional Relationships	
Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.	
Standard #:	**Standard:**
7.RP.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
7.RP.2	Recognize and represent proportional relationships between quantities. a. 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. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. c. Represent proportional relationships by equations. *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*. d. 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.
Domain: Geometry	
Cluster: Draw, construct, and describe geometrical figures and describe the relationships between them.	
Standard # :	**Standard:**
7.G.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Unit 2 Part 1 Essential Questions: ● How do you recognize and represent proportional relationships between quantities? ● How do you apply proportions?	**Unit 2 Part 1 Enduring Understandings:** ● Utilize proportional relationships to solve real-world problems.

Unit 2 Part 1 Objectives:

- Students will be able to write ratios for various situations.
- Students will be able to determine if ratios are equivalent as well how to determine and unknown in an equivalent ratio.
- Students will be able to calculate unit rates to solve word problems.
- Students will use proportions to solve problems.
- Students will use proportions to determine the relationship in a table and graph, determine the constant of proportionality, write equations and understand graphs or proportions.
- Students will use proportions to solve problems involving scale drawings and similar figures.

Evidence of Learning

Formative Assessments:

- Questioning strategies used throughout the unit.
- 7 Quizzes

Summative Assessment:

- Cumulative Assessment

Lesson Plan

Topics	Timeframe
Topic #1: Writing Ratios (6.1 in 7th HM textbook)	0.5 day
Topic #2: Equivalent Ratios (6.1 in 7th HM textbook) **Quiz #1**	0.5 day
Topic #3: Rates (6.1 in 7th HM textbook) **Quiz #2**	1 day
Topic #4: Proportions (6.2 and 6.3 in 7th HM textbook)	1 day

Quiz #3	
Topic #5: Direct & Indirect Relationships in Tables and Graphs (p.290-291 for tables in 7th HM textbook)	1 day
Topic #6: Constant of Proportionality **Quiz #4**	1 day
Topic #7: Writing Equations for Proportions (6.2 and 6.3 in 7th HM textbook) **Quiz #5**	1 day
Topic #8: Understanding Graphs of Proportions	0.5 day
Topic #9: Problem Solving	0.5 day
Topic #10: Scale Drawings (6.6 in 7th HM textbook) Lab: RAFT – Planet Beads Lab: RAFT – Sun and Planets to Scale **Quiz #6**	1 day
Topic #11: Similar Figures (6.4 & 6.5 in 7th HM textbook) Lab: RAFT – Building it Bigger **Quiz #7**	1 day
Review and Chapter Test	1 day

Curriculum Resources:

- Textbook and online resources
- https://njctl.org/courses/math/7th-grade/
- http://www.raftbayarea.org/ideas/Planet%20Beads.pdf
- http://www.raftbayarea.org/ideas/Sun%20and%20Planets%20to%20Scale.pdf
- http://www.raftbayarea.org/ideas/Building%20it%20Bigger.pdf

Pre-Algebra Math 7
Unit 2 Part 2

Title: Percents	
Subject: Pre-Algebra Math 7	**Length of Time**: 2 weeks (8 days)
Unit 2 Part 2 Summary: Unit 2 Part 2 will introduce students to percents. They will learn the different types of percent problems and how to represent the percent equations algebraically. They will also learn how to solve real world application problems involving percents.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ○ Additional Clusters	
Domain: Ratios and Proportional Relationships	
Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.	
Standard #:	**Standard:**
7.RP.3	Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.
Domain: Expressions and Equations	
Cluster: Use properties of operations to generate equivalent expressions	
Standard # :	**Standard:**
7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.
Cluster: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
Standard #:	**Standard:**
7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
Unit 2 Part 2 Essential Question: · How are percents used to help solve real world application problems? · What are the different ways percent problems are represented?	**Unit 2 Part 2 Enduring Understandings:** · Percents are used in real world problems. · Percents can be applied to problems in different ways.

Unit 2 Part 2 Objectives:

- Students will be able to relate fractions, decimals, and percents to each other.
- Students will solve three different types of percent problems.
- Students will represent percent equations in an algebraic context.
- Students will apply percent of increase and percent of decrease when solving problems.
- Students will use their knowledge of percents to help them solve real world problems.

Evidence of Learning

Formative Assessments:

- Questioning strategies used throughout the unit.
- 3 Quizzes

Summative Assessment:

- Cumulative Assessment

Pacing Guide

Topics	Timeframe
Lesson #1:Relating Fractions, Decimals and Percents/ Quiz #1 (7.1 in 7th HM textbook)	1 days
Lesson #2: Three Types of Percent Problems (7.2, 7.3 & 7.4 in 7th HM textbook)	2 days
Lesson #3: Percent of Change/ Quiz #2 (7.5 in 7th HM textbook)	1 days
Lesson #4: Representing Percent Equations Algebraically	1 days
Lesson #5: Applied Percent of Decrease (7.6 in 7th HM textbook)	0.5 day
Lesson #6: Applied Percent of Increase (7.6 and 7.7 in 7th HM textbook)	0.5 day
Lesson #7: Real-life Application Problems/ Quiz #3 (7.6 and 7.7 in 7th HM textbook)	1 day
Review and Cumulative Assessment	1 day

Curriculum Resources:

- Textbook and online resources
- https://njctl.org/courses/math/7th-grade/

Pre-Algebra Math 7 Curriculum Unit 3 (3 Parts)	
Title: Expressions, Equations, Inequalities, and Scientific Notation	
Subject: Pre-Algebra Math 7	**Length of Time:** 6 Weeks (25.5 days)
Unit 3 Summary: Unit 3 Part 1 will introduce students to different properties of expressions. They will be able to combine like terms, write expressions when given a verbal phrase, and evaluate both numeric and algebraic expressions. Unit 3 Part 2 will introduce students to different properties equations can have. They will be able to combine like terms, solve multi-step equations, and deal with inequalities. Also, they will identify the associative, commutative, and distributive properties. Unit 3 Part 2 also explores linear equations. Students learn to solve equations starting with a review of inverse operations and two-step equations and progressing to more complex equations. Unit 3 Part 2 concludes with using the skills to solve word problems. Unit 3 Part 3 will introduce the concept of scientific notation to students. It will demonstrate the purpose of scientific notation and how to write numbers using this form. They will be able to convert numbers between scientific notation and standard form, as well as perform different operations within equations.	
Learning Targets	
PARCC ■ Major Clusters; ◘ Supporting Clusters; ○ Additional Clusters	
Standard #s:	**Standards:**
7.NS.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. d. Apply properties of operations as strategies to add and subtract rational numbers.(Part 2)
7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. c. Apply properties of operations as strategies to multiply and divide rational numbers (Part 2)
7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions.
7.EE.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*
7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between

	forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. 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. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.
8.EE.7	7. Solve linear equations in one variable. a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
Standards for Math Practice	
Standard#:	**Standard:**
MP1	Making sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.
Modifications	
Standards-based grading, reassessments, differentiate assignments, scaffold instruction, study guides, peer/teacher tutoring assistance, tiered assignments, student choice, modify pace, lesson tutorial videos, performance assessments, modified rubrics, assessment modified for IDEA, add enrichment activities, add extension activities to projects, challenge activities	
Interdisciplinary Connections	
Science, Language Arts, and Technology	

Integration of 21st Century Themes and Skills
21st Century Skills · Financial, Economic, Business, and Entrepreneurial Literacy **21st Century Themes** · Critical Thinking and Problem Solving · Communication and Collaboration · Life and Career Skills

Pre-Algebra Math 7 Curriculum Unit 3 Part 1	
Title: Expressions	
Subject: Pre-Algebra Math 7	**Length of Time:** 1 week (4.5 days)
Unit 3 Part 1 Summary: Unit 3 Part 1 will introduce students to different properties of expressions. They will be able to combine like terms, write expressions when given a verbal phrase, and evaluate both numeric and algebraic expressions.	
Learning Targets	
PARCC ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters	
Domain: Number System	
Cluster: Apply and extend previous understandings of operations with fractions.	
Standard #:	**Standard:**
7.NS.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. d. Apply properties of operations as strategies to add and subtract rational numbers.
7.NS.2	Apply and extend previous understandings of multiplication and division to multiply and divide rational numbers. c. Apply properties of operations as strategies to multiply and divide rational numbers

7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
Cluster: Use properties of operations to generate equivalent expressions	
Standard #:	**Standard:**
7.EE.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*
Cluster: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
Standard #s:	**Standards:**
7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. 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. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

Unit 3 Part 1 Essential Questions:	**Unit 3 Part 1 Enduring Understandings:**
· What is a numeric expression & how is it evaluated? · What is an algebraic expression & how is it simplified? · How is an algebraic expression evaluated?	· A numeric expression is an expression of numbers and operations. When evaluating them, there is a specific order, called the order of operations. · An algebraic expression is an expression that contains both numbers and variables that is simplified using the distributive property and combining like terms. · An algebraic expression is evaluated using substitution followed by the order of operations.
Unit 3 Part 1 Objectives:	

- Students will identify constants, coefficients, and variables in an algebraic expression.
- Students will evaluate a numerical expression using the correct order of operations.
- Students will use the distributive property to simplify algebraic expressions.
- Students will learn to simplify algebraic expressions by combine like terms.
- Students will translate verbal phrases into mathematical and algebraic expressions.
- Students will evaluate algebraic expressions when each variable is assigned a value using substitution and the order of operations.

Evidence of Learning

Formative Assessments:

- Questioning strategies used throughout the unit.
- 3 Quizzes

Summative Assessment:

- Cumulative Assessment

Pacing Guide

Topics	Timeframe
Topic #1: Mathematical Expressions (1.1 in HM textbook)	0.25 day
Topic #2: Order of Operations (1.3 in HM textbook) **Quiz #1**	0.25 day
Topic #3: The Distributive Property (2.2 in HM textbook)	1 day
Topic #4: Combining Like Terms (2.3 in HM textbook) Lab – Comparing Cards Lab – Ordering Combo Meals **Quiz #2**	1 day

Topic #5: Translating Words into Expressions (1.1 and 2.4 in HM text book)	0.5 day
Topic #6: Evaluating Expressions **#Quiz 3**	0.5 day
Review and Cumulative Assessment	1 day
Curriculum Resources: · HYPERLINK "https://njctl.org/courses/math/7th-grade/" https://njctl.org/courses/math/7th-grade/	

Pre-Algebra Math 7 Curriculum Unit 3 Part 2 Plan	
Title: Solving Equations & Inequalities	
Subject: Pre-Algebra Math 7	**Length of Time:** 4 Weeks (16.5 days)
Unit 3 Part 2 Summary: Unit 3 Part 2 will introduce students to different properties equations can have. They will be able to combine like terms, solve multi-step equations, and deal with inequalities. Also, they will identify the associative, commutative, and distributive properties. Unit 3 Part 2 also explores linear equations. Students learn to solve equations starting with a review of inverse operations and two-step equations and progressing to more complex equations. Unit 3 Part 2 concludes with using the skills to solve word problems.	
Learning Targets	
PARCC ■ Major Clusters; ◘ Supporting Clusters; ○ Additional Clusters	
Domain: Expressions and Equations	
Cluster: Use properties of operations to generate equivalent expressions	
Standard #s	**Standard:**

7.EE.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*
Cluster: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
Standard #s:	**Standards:**
7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. 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. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.
7.EE.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. a. 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. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? b. 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. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions
Domain: Expressions & Equations	
Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.	

8.EE.7	7. Solve linear equations in one variable. a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Unit 3 Part 2 Essential Questions: · How are equations solved? · What are different properties of equations and how can they help solve them? · What happens when two sides of an equation are not equal? · How can the value of an unknown variable be found?	**Unit 3 Part 2 Enduring Understandings:** · Equations can be solved using different properties. · Sometimes there is more than one step to solve in an equation. · Inequalities are used when solving for real life application problems. · How to solve an equation in one variable for that variable. · How to translate word problems into an equation.

Unit 3 Part 2 Objectives:

· Students will examine commutative and associative properties of different equations.
· Students will combine like terms within an equation and learn to use the distributive property to solve equations.
· Students will solve multi-step equations involving different techniques.
· Students will graph and solve inequalities involving addition, subtraction, multiplication, and division.
· Students will be able to solve multiple-step equations.
· Students will be able to solve equations that contain fractions.
· Students will be able to solve equations that contain the same variable on both sides of the equation.
· Students will be able to simplify and compare algebraic expressions that contain the same variable.
· Students will be able to and translate word problems into equations and solve them.

Evidence of Learning

Formative Assessments:

· Questioning strategies used throughout the unit. · 8 Quizzes
Summative Assessment: · Cumulative Assessment

Pacing Guide	
Topics	**Timeframe**
Topic #1: Equations & Identities	0.5 day
Topic #2: Solving an Equation for a Variable **Quiz #1**	1.5 days
Topic #3: One Step Equations (2.5 and 2.6 in HM textbook)	1 day
Topic #4: Two Step Equations (Combine 7th and 8th) (3.1 in HM textbook) Lab: RAFT – Shape up with Algebra (7th) **Quiz #2**	1 days
Topic #5: Multi-Step Equations (Combine 7th and 8th) (3.2 in HM textbook) Lab: RAFT – Modeling Simple Equations (7th) **Quiz #3 - Multi-Step Equations (8th)**	1 days
Topic #6: Distributing Fractions in Equations (5.6 in HM textbook)	1 day
Topic #7 Solving Equations that Contain Fractions (8th) **Quiz #4 (7th)** (5.6 in HM textbook)	1 day
Topic #8: Equations with the Same Variable on Both Sides (8th)(3.3 in HM text book)	1 day
Topic #9: Comparing Expressions with the Same Variable (8th)	1 day

Quiz #5 – Equations with the Same Variable on Both Sides (8th)	
Topic #10: Writing & Solving Algebraic Equations (Combine 7th and 8th) Lab: RAFT – Dive into Square Pools (7th) **Quiz #6**	2 days
Topic #11: Graphing & Writing Inequalities with One Variable **Quiz #7** (3.4 and 3.5 in HM text book)	2 days
Topic #12: Simple Inequalities Involving Addition & Subtraction (3.4 in HM textbook)	1 day
Topic #13: Simple Inequalities involving Multiplication & Division (3.5 in HM textbook) Lab: Multiplying or Dividing by a Negative Number **Quiz #8**	1 days
Review and Cumulative Assessment	1.5 days

Curriculum Resources:

- https://njctl.org/courses/math/7th-grade/
- http://www.raftbayarea.org/ideas/Shape%20Up%20with%20Algebra.pdf
- http://www.raftbayarea.org/ideas/Modeling%20Simple%20Equations.pdf
- http://www.raftbayarea.org/ideas/Dive%20into%20Square%20Pools.pdf
- https://njctl.org/courses/math/8th-grade-math/
- http://www.raftbayarea.org/ideas/Occasions%20for%20an%20Equation.pdf HYPERLINK "http://www.raftbayarea.org/ideas/Dive%20into%20Square%20Pools.pdf"

Pre-Algebra Math 7 Curriculum **Unit 3 Part 3**	
Title: Scientific Notation	
Subject: Pre-Algebra Math 7 (NJCTL 8th)	**Length of Time**: 1 week (4.5 days)

Unit 3 Part 3 Summary: Unit 3 Part 3 will introduce the concept of scientific notation to students. It will demonstrate the purpose of scientific notation and how to write numbers using this form. They will be able to convert numbers between scientific notation and standard form, as well as perform different operations within equations.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ○ Additional Clusters	
Domain: Expressions & Equations	
Cluster: Expressions and equations work with radicals and integer exponents.	
Standards:	
8.EE.3	Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.
8.EE.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

Unit 3 Part 3 Essential Question:	**Unit 3 Part 3 Enduring Understanding:**
· How will scientific notation help when writing numbers and equations? · How is scientific notation used in real world application problems? · How numbers are compared and manipulated using scientific notation?	· Scientific notation will help demonstrate very large and very small numbers when solving real world application problems. · Numbers can be represented in scientific notation and still be manipulated using operations such as addition, subtraction, multiplication, and division.

Unit 3 Part 3 Objectives:

- Students will express numbers using scientific notation.
- Students will recognize the difference between scientific notation and standard form.
- Students will distinguish the difference between different numbers written in scientific notation.
- Students will solve equations with addition, subtraction, multiplication, and division using numbers in scientific notation.

Evidence of Learning

Formative Assessments:

- Questioning strategies used throughout the unit.
- 5 Quizzes

Summative Assessment:

- Cumulative Assessment

Pacing Guide

Topics	Timeframe
Topic #1: Purpose of Scientific Notation Lab: RAFT – One in a Million **Quiz #1**	1 day
Topic #2: How to Write Numbers in Scientific Notation (4.7 in HM textbook)	0.25 day
Topic #3: How to convert between Scientific Notation and Standard Form (4.7 in HM textbook) **Quiz #2**	0.25 day
Topic #4: Magnitude **Quiz #3**	0.5 day
Topic #5: Comparing Numbers in Scientific Notation **Quiz #4**	1 day

Topic #6: Multiply and Divide with Scientific Notation (Focus on Operations 4.7 Operations in Scientific Notation in HM textbook)	0.5 day
Topic #7: Addition and Subtraction with Scientific Notation (Focus on Operations 4.7 Operations in Scientific Notation in HM textbook) **Quiz #5**	0.5 day
Review and Cumulative Assessment	1 day

Curriculum Development Resources:

- Textbook and online resources
- https://njctl.org/courses/math/8th-grade-math/
- http://www.raftbayarea.org/ideas/One%20in%20a%20Million.pdf HYPERLINK "http://www.raftbayarea.org/ideas/One%20in%20a%20Million.pdf"

Pre-Algebra Math 7 Curriculum **Unit 4 (5 Parts)**	
Title: 2D and 3D Geometry	
Subject: Pre-Algebra Math 7	**Length of Time:** 8 weeks (41 days)
Unit 4 Summary: Unit 4 Part 1 will have students determining if a triangle can be created using the given conditions. Students will also create some simple geometric constructions. In Unit 4 part 2, students will be able to use models to show their understanding of congruent and similar figures. Unit 4 Part 3 will allow students to solve for area and perimeter of different 2D geometrical shapes. They will calculate the area of rectangles, parallelograms, triangles, trapezoids, circles, irregular figures, and shaded figures. They will also explore special pairs of angles and the relationships they hold. Unit 4 Part 4 will introduce students to different properties of 3D figures. They will be able to compute the surface area of 3D figures, as well as their volume. This part will also provide problems of how 3D figures are found in everyday life. Unit 4 Part 5 will provide a deeper understanding of the Pythagorean Theorem and its converse for students. They will apply the theorem to problems involving right triangles that model real world problems. They will also find distances and midpoints between two points.	
Learning Targets	
PARCC ■ Major Clusters; ◘ Supporting Clusters; ○ Additional Clusters	
Standard#:	**Standard:**
8.G.1	Verify experimentally the properties of rotations, reflections, and translations:

	a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines.
8.G.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
8.G.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
8.G.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
8.G.5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*
8.G.6	Explain a proof of the Pythagorean Theorem and its converse.
8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
7.G.2	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. 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.
7.G.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
7.G.5	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.
7.G.6	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.

7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
7.EE.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
7.G.3	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
8.G.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
Technology 8.2.8.A.4	Redesign an existing product that impacts the environment to lessen its impact (s) on the environment.
Technology 8.2.8.A.5	Describe how resources such as material, energy, information, time, tools, people, and capital contribute to a technological product or system.
Technology 8.2.8.C.5.a	Create a technical sketch of a product with materials and measurements labeled.
Technology 8.2.8.C.8	Develop a proposal for a chosen solution that include models (physical, graphical, or mathematical) to communicate the solution to peers.
Technology 8.2.8.D.1	Design and create a product that addresses a real world problem using a design process under specific constraints.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.
Modifications	

Standards-based grading, reassessments, differentiate assignments, scaffold instruction, study guides, peer/teacher tutoring assistance, tiered assignments, student choice, modify pace, lesson tutorial videos, performance assessments, modified rubrics, assessment modified for IDEA, add enrichment activities, add extension activities to projects, challenge activities
Interdisciplinary Connections
Science, Language Arts, and Technology
Integration of 21st Century Themes and Skills
21st Century Skills ● Financial, Economic, Business, and Entrepreneurial Literacy **21st Century Themes** ● Critical Thinking and Problem Solving ● Communication and Collaboration ● Life and Career Skills

Pre-Algebra Math 7 Curriculum Unit 4 Part 1	
Title: Drawing Geometric Figures	
Subject: Pre-Algebra Math 7	**Length of Time:** 1 week (4 days)
Unit 4 Part 1 Summary: Unit 4 Part 1 will have students determining if a triangle can be created using the given conditions. Students will also create some simple geometric constructions.	
Learning Targets	
PARCC ■ Major Clusters; ◘ Supporting Clusters; ○ Additional Clusters	
Domain: Geometry	

Cluster: Draw, construct, and describe geometrical figures and describe the relationships between them.	
Standard #s:	**Standards:**
7.G.2	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. 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.

Unit 4 Part 1 Essential Questions:	**Unit 4 Part 1 Enduring Understandings:**
· Can we determine if three side lengths would create a triangle?	· Geometric figures can be drawn based on given conditions.

Unit 4 Part 1 Objectives:

- Students will be able to determine is a triangle is possible.
- Students will be able to draw triangles freehand, with ruler and protractor and with technology.

Evidence of Learning

Formative Assessments:

- Questioning strategies used throughout the unit.
- 1 Quiz

Summative Assessment:

- 1 Quiz

Pacing Guide

Topics	Timeframe
Topic #1: Determining if a Triangle is Possible (Concept Activity 10.1) (Hands on Lab p. 536a in 7th HM textbook)	2 days
Topic #2: Geometric Constructions: The Basics (Hands on Lab p. 326 in 7th HM textbook) **Quiz #1**	2 days

Curriculum Resources:

- https://njctl.org/courses/math/7th-grade/

Roman Mosaic - MARS
Glowing - yummymath
Drawing MARS

Pre-Algebra Math 7 Curriculum
Unit 4 Part 2

Title: 2D Geometry (from 8th)	
Subject: Pre-Algebra Math 7	**Length of Time:** 2 weeks (9 days)
Unit 4 Part 2 Summary: In Unit 4 part 2, students will be able to use models to show their understanding of congruent and similar figures.	
Learning Targets	
PARCC ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters	
Domain: Geometry	
Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.	
Standard #s:	**Standards:**
8.G.1	Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines.
8.G.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
8.G.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
8.G.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
8.G.5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*

Unit 4 Part 2 Essential Questions:	**Unit 4 Part 2 Chapter Enduring Understandings:**
● How can you use models of one and two-dimensional figures to show congruent figures? ● How can you use models of one and two-dimensional figures to show similar figures?	● Congruent figures can be formed by a series of transformations. ● Similar figures can be formed by a series of transformations. ● Understand angle relationships in one and two-dimensional figures.

Unit 4 Part 2 Objectives:

- Students will be able to transform figures on a coordinate plane.
- Students will be able to use their understanding of angle relationships to find unknown angles.
- Students will be able to describe a sequence of transformations that will result in congruent figures.
- Students will be able to describe a sequence of transformations and dilations that will result in similar figures.

Evidence of Learning

Formative Assessments:

- Questioning strategies used throughout the unit.
- 7 Quizzes

Summative Assessment:

- Cumulative Assessment

Pacing Guide

Topics - 8th Grade unless otherwise noted	Timeframe
Topic #1: Translations (12.4 in HM textbook) Lab: Translations **Quiz #1**	1 days
Topic #2: Rotations (12.6 in HM textbook) **Quiz #2**	1 days
Topic #3: Reflections (12.5 in HM textbook)	1 days

Quiz #3	
Topic #4: Dilations (12.7 in HM textbook) Lab: Dilations	1 days
Topic #5: Symmetry (12.5 and 12.6 in HM textbook) **Quiz #4**	1 days
Topic #6: Congruence & Similarity (Concept Activity 12.6 and 12.7) **Quiz #5**	1 days
Topic #7: Special Pairs of Angles (Also has resources in 7th grade) (12.1 and 12.2 in HM textbook) **Quiz #6**	1 days
Topic #8: Remote Exterior Angles **Quiz #7**	1 days
Review and Cumulative Assessment	1 days

Curriculum Development Resources

- Textbook and online resources
- https://njctl.org/courses/math/8th-grade-math/
- https://www.engageny.org/resource/grade-8-mathematics-module-2-topic-overview HYPERLINK "https://www.engageny.org/resource/grade-8-mathematics-module-2-topic-overview"

Pre-Algebra Math 7 Curriculum **Unit 4 Part 3**	
Title: 2D Geometry	
Subject: Pre-Algebra Math 7	**Length of Time:** 2 weeks (10 days)
Unit 4 Part 3: Unit 4 Part 3 will allow students to solve for area and perimeter of different 2D geometrical shapes. They will calculate the area of rectangles, parallelograms, triangles, trapezoids, circles, irregular figures, and shaded figures. They will also explore special pairs of angles and the relationships they hold.	
Learning Targets	

PARCC ■ Major Clusters; ◘ Supporting Clusters; ○ Additional Clusters	
Domain: Geometry	
Cluster: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	
Standard #s:	**Standards:**
7.G.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
7.G.5	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.
7.G.6	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.
Domain: Expressions and Equations	
Cluster: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
Standard # :	**Standard:**
7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
7.EE.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
Unit 4 Part 3 Essential Question: What is difference between area and perimeter?	**Unit 4 Part 3 Enduring Understandings:** · Formulas can be determined and used to calculate the area of both regular and irregular shapes.
Unit 4 Part 3:: · Students will be able to determine is a triangle is possible. · Students will be able to draw triangles freehand, with ruler and protractor and with technology. · Students will calculate the perimeter of different 2D geometrical figures. · Students will calculate the circumference and area of different circles. · Students will be able to determine whether a triangle is possible or not. · Students will calculate the area of rectangles, parallelograms, triangles and trapezoids. · Students will use previous knowledge of area formulas to calculate the area of irregular and shaded figures.	

Evidence of Learning
Formative Assessments: · Questioning strategies used throughout the unit. · 5 Quizzes
Summative Assessment: · Cumulative Assessment

Pacing Guide	
Topics - 7th Grade	**Timeframe**
Topic #1: Perimeter & Circumference (10.4 in HM textbook) Lab: RAFT – Finding Pi Quiz #1	1 days
Topic #2: Area of Rectangles (p.71 in 7th HM textbook)	0.5 day
Topic #3: Area of Parallelograms (10.3 in HM textbook) Quiz #3	0.5 day
Topic #4: Area of Triangles (p.71 in 7th HM textbook)	1 day
Topic #5: Area of Trapezoids (10.3 in HM textbook)	1 day
Topic #6: Area of Circles (10.4 in HM textbook) Quiz #4	1 day
Topic #7: Mixed Review	1 day
Topic #8: Area of Irregular Figures (10.3 in HM text book)	1 day
Topic #9: Area of Shaded Regions Quiz #5	1 day
Review and Cumulative Assessment	2 day

Curriculum Resources:

https://njctl.org/courses/math/7th-grade/

https://njctl.org/courses/math/7th-grade/

http://www.raftbayarea.org/ideas/Finding%20Pi.pdf

Pre-Algebra Math 7 Unit 4 Part 4

Title: 3-D Geometry	
Subject: Pre-Algebra Math 7	**Length of Time:** 3 weeks (13 Days)
Unit 4 Part 4: Unit 4 Part 4 will introduce students to different properties of 3D figures. They will be able to compute the surface area of 3D figures, as well as their volume. This part will also provide problems of how 3D figures are found in everyday life.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ○ Additional Clusters	
Domain: Geometry	
Cluster: Draw, construct, and describe geometrical figures and describe the relationships between them.	
Standard #:	**Standard:**
7.G.3	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
Cluster: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	
7.G.6	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.
8.G.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
Domain: Expressions and Equations	
Cluster: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. 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. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.
7.EE.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Unit 4 Part 4 Essential Questions:	**Unit 4 Part 4 Enduring Understandings:**
· How are 3D figures different from 2D figures? · What is a cross section of a figure and how will that help compute properties of the figure? · How are surface area and volume found for a 3D figure? · What is a 3-dimensional figure? · How can I find the volume of a 3-dimensional figure? · How can the volume of a 3-dimensional figure help me solve real world problems?	· 3D figures have unique characteristics and properties. · Perimeter and area of 2D figures are useful when finding volume and surface area of 3D figures. · There are different formulas that can be used when solving for the volume of a 3-dimensional figure.

Unit 4 Part 4 Objectives:

- Students will be introduced to 3D solids and cross sections of 3D figures.
- Students will learn how to compute the volume of different 3D figures.
- Students will compute surface area of different 3D figures.
- Students will identify what a 3-dimensional figure is.

Evidence of Learning

Formative Assessments:

- Questioning strategies used throughout the unit
- 3 Quizzes

Summative Assessment:

- Cumulative Assessment

Pacing Guide

Topics - (Combination of 7th and 8th grade)	Timeframe
Topic #1: 3D Solids Lab: RAFT – Making 3D Shapes	1 day
Topic #2: Cross Sections of 3D Figures (Focus on Geometry 10.6 in HM textbook) **Quiz #1**	1 day
Topic #3: Volume: Prisms & Cylinders (10.7 in HM textbook) Lab: Volume Activity Lab: RAFT – The Long and the Short of It	1 day
Topic #4: Volume: Pyramids, Cones & Spheres (10.8, just pyramids and cones, in HM textbook) Lab: RAFT - Volume Verification (8th Grade) **Quiz #2**	2 days

Topic #5: Surface Area – Prisms (10.5 in HM textbook) Lab: Surface Area Activity	2 days
Topic #6: Surface Area – Pyramids (10.6 in HM textbook)	1 day
Topic #7: Surface Area – Cylinders (10.5 in HM textbook)	1 day
Topic #8: Surface Area – Spheres **Quiz #3**	1 day
Topic #9: More Practice	1 day
Review and Cumulative Assessment	2 days

Curriculum Resources:

- Textbook and online resources
- https://njctl.org/courses/math/7th-grade/
- http://www.raftbayarea.org/ideas/Making%203D%20Shapes.pdf
- http://www.raftbayarea.org/ideas/Long%20and%20Short%20of%20It.pdf
- https://njctl.org/courses/math/8th-grade-math/
- http://www.njctl.org/courses/math/8th-grade-math/3d-geometry/volume-activity/
- http://www.raftbayarea.org/ideas/Volume%20Verification.pdf

Pre-Algebra Math 7 Curriculum **Unit 4 Part 5**	
Title: Pythagorean Theorem, Distance and Midpoints	
Subject: Pre-Algebra Math 7	**Length of Time:** 1 Week (5 Days)
Unit 4 Part 5 Summary: Unit 4 Part 5 will provide a deeper understanding of the Pythagorean Theorem and its converse for students. They will apply the theorem to problems involving right triangles that model real world problems. They will also find distances and midpoints between two points.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ○ Additional Clusters	

Domain: Geometry	
Cluster: Understand and apply the Pythagorean Theorem	
Standard #s:	**Standards:**
8.G.6	Explain a proof of the Pythagorean Theorem and its converse.
8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Unit 4 Part 5 Essential Question: ● How does the Pythagorean Theorem help solve real world problems? ● How do we compute the distance and midpoint within problems?	**Unit 4 Part 5 Enduring Understanding:** ● The Pythagorean Theorem can be used to solve real world problems. ● The Pythagorean Theorem aids in solving problems involving right triangles.

Unit 4 Part 5 Objectives:

- Students will be able to explain the proof of the Pythagorean Theorem.
- Students will find unknown side lengths using the Pythagorean Theorem.
- Students will use the Pythagorean Theorem to solve problems involving distance and midpoints.
- Students will solve real world application problems using the Pythagorean Theorem.

Evidence of Learning

Formative Assessments:

- Questioning Strategies used throughout the unit.
- 2 Quizzes

Summative Assessment:

- Cumulative Assessment

Lesson Plan

Topics (from 8th NJCTL)	Timeframe
Topic #1: Proofs Lab #1: Introduction to Proofs	1 day
Topic #1: Pythagorean Theorem (9.3 in HM textbook) **Quiz #1**	1 day
Topic #2: Distance Formula (Concept Activity 9.3 Proving Pythagorean Theorem and its Converse in HM textbook)	1 day
Topic #3: Midpoints (9.5 in HM textbook) **Quiz #2**	1 day
Review and Cumulative Assessment	1 day

Curriculum Development Resources:

- Textbook and online resources
- http://njctl.org/courses/math/8th-grade-math/
- Water Park Project HYPERLINK "http://njctl.org/courses/math/8th-grade-math/"

Pre-Algebra Math 7 Curriculum **Unit 5 (1 Part)**	
Title: Statistics & Probability	
Subject: Pre-Algebra Math 7	**Length of Time:** 2 weeks (10 days)
Unit 5 Summary: This unit will introduce students to the concept of solving problems that involve different types of events. They will examine sampling, compare two populations, and distinguish properties of events. Permutations, combinations, and probability will be learned to help solve problems. The fundamental counting principle will also be utilized throughout the chapter. Students will also work with statistical measures.	
Learning Targets	
PARCC ■ Major Clusters; ◘ Supporting Clusters; ○ Additional Clusters	

Domain: Statistics and Probability	
Cluster: Use random sampling to draw inferences about a population.	
Standard #s:	**Standards:**
7.SP.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
7.SP.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. 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.
Cluster: Draw informal comparative inferences about two populations.	
Standard #s :	**Standards:**
7.SP.3	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.
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. 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
Cluster: Investigate chance processes and develop, use, and evaluate probability models.	
Standard #s:	**Standards:**
7.SP.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.

7.SP.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. 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.
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. a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. 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. b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. 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?
7.SP.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event. c. Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?
Technology 8.1.8.A.4	Graph and calculate data within a spreadsheet and present a summary of the results
Technology 8.1.8.A.5	Create a database query, sort and create a report and describe the process, and explain the report results
Technology 8.1.8.F.1	Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision

Unit 5 Objectives:

- Students will be introduced to the concept of sampling.
- Students will be able to draw inferences about a population based off a sample.
- Students will be able to compare two populations and solve real world application problems with them.
- Students will be able to measure the difference between the centers by expressing it as a multiple of a measure of variability.
- Students will understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.
- Students will be able to use experimental and theoretical probability to determine the likelihood of an event occurring.
- Students will use the fundamental counting principle to solve problems.
- Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

Evidence of Learning

Formative Assessments:

- Questioning strategies used throughout the unit.
- 7 Quizzes

Summative Assessment:

- Cumulative Assessment

Pacing Guide

Topics	Timeframe
Topic #1:Introduction to Probability (6.7 in HM textbook)	1 day
Topic #2:Experimental and Theoretical **Quiz #1**	1 day
Topic #3:Sampling (11.4 and Focus on Data Analysis 11.5 Comparing Population in HM textbook) Lab: RAFT – Ample Samples **Quiz #2**	1 day
Topic #4: Simulations (Find Resources)	1 day
Topic #5:Word Problems **Quiz #3**	1 day

Topic #6:Probability of Compound Events (6.8 and 11.9 in HM textbook) Lab: RAFT – Adventures in Probability Lab: RAFT – Monty Hall Makes a Deal **Quiz #4**	1 day
Topic #7:Measures of Center **Quiz #5**	1 day
Topic #8:Measures of Variation (11.2 in HM textbook) **Quiz #6**	1 day
Topic #9:Mean Absolute Deviation (Not in HM textbook) **Quiz #7**	1 day
Review & Cumulative Assessment	1 day

Curriculum Resources:

- https://njctl.org/courses/math/7th-grade/
- http://www.raftbayarea.org/ideas/Ample%20Samples.pdf
- http://www.raftbayarea.org/ideas/Adventures%20in%20Probability.pdf
- HYPERLINK "http://www.raftbayarea.org/ideas/Monty%20Hall%20Makes%20a%20Deal.pdf" http://www.raftbayarea.org/ideas/Monty%20Hall%20Makes%20a%20Deal.pdf

Standards for Math Practice	
Standard#:	**Standard:**
MP1	Making sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.

Modifications
Standards-based grading, reassessments, differentiate assignments, scaffold instruction, study guides, peer/teacher tutoring assistance, tiered assignments, student choice, modify pace, lesson tutorial videos, performance assessments, modified rubrics, assessment modified for IDEA, add enrichment activities, add extension activities to projects, challenge activities
Interdisciplinary Connections
Science, Language Arts, and Technology
Integration of 21st Century Themes and Skills
21st Century Skills · Financial, Economic, Business, and Entrepreneurial Literacy **21st Century Themes** · Critical Thinking and Problem Solving · Communication and Collaboration · Life and Career Skills

Pre-Algebra Math 7 Curriculum **Unit 6 (4 Parts)**	
Title: Graphing Linear Equations	
Subject: Pre-Algebra Math 7	**Length of Time:** 8 weeks (38 days)
Unit Summary: Unit 6 Part 1 covers how to graph and write linear equations. Students will develop the relationship of the slope and points on a line and write linear equations in Point-Slope form and Slope-Intercept form. Students will also learn how write the equation of a line with different given quantities. They can use these different graphs to solve the equation as well. Unit 6 Part 2 will allow students to interpret functions. They will also construct graphs from two quantities that form a linear relationship and describe the relationship using that graph. Unit 6 Part 3 will allow students to understand how functions operate and relates to a graph. They will compare properties of two functions and represent functions in multiple ways. They will be introduced to slope-intercept form and recognize that the graph will be a straight line. Unit 6 Part 4 will allow students to examine scatter plots and interpret data into a graph. They will be able to	

understand different patterns and lines of best fit within graphs. They will use linear models and two variable data to explain real life situations. They also will examine frequencies and bivariate data.	
Learning Targets	
PARCC ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters	
Standard #s:	**Standards:**
8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
8.EE.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b
8.F.3	Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
8.SP.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association
8.SP.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.

8.SP.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.
8.SP.4	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?
8.F.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
8.F.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.
8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
8.F.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.
8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally

Standards for Math Practice	
Standard#:	**Standard:**
MP1	Making sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.

Modifications
Standards-based grading, reassessments, differentiate assignments, scaffold instruction, study guides, peer/teacher tutoring assistance, tiered assignments, student choice, modify pace, lesson tutorial videos, performance assessments, modified rubrics, assessment modified for IDEA, add enrichment activities, add extension activities to projects, challenge activities
Interdisciplinary Connections
Science, Language Arts, and Technology
Lesson Components
21st Century Skills · Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Themes

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Life and Career Skills

Pre-Algebra Math 7 Curriculum **Unit 6 Part 1**	
Title: Graphing Linear Equations	
Subject: Pre-Algebra Math 7	**Length of Time:** 3 weeks (13 days)
Unit 6 Part 1 Summary: Unit 6 Part 1 covers how to graph and write linear equations. Students will develop the relationship of the slope and points on a line and write linear equations in Point-Slope form and Slope-Intercept form. Students will also learn how write the equation of a line with different given quantities. They can use these different graphs to solve the equation as well.	
Learning Targets	
PARCC ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters	
Domain: Expressions & Equations	
Cluster: Understand the connections between proportional relationships, lines, and linear equations.	
Standard #s:	**Standards:**
8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

8.EE.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b
Domain: Functions	
Cluster: Define, evaluate, and compare functions	
Standard #s:	**Standards:**
8.F.3	Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
Cluster: Use functions to model relationships between quantities	
8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

Unit 6 Part 1 Essential Questions: · What is meant by the slope of a line, and how can knowing a line's slope help to graph a line and find parallel and perpendicular lines? · How can real world situations be modeled by proportional relationships? · How can solutions be found within an equation?	**Unit 6 Part 1 Enduring Understanding:** · Various methods can be used to solve equations and the solution to an equation can be checked by substituting into the original equation. · Linear relationships can be graphed to help solve real world problems and make predictions.

Unit 6 Part 1 Objectives:

· Students will be able to identify point on a line given its equation.

· Students will be able to graph a line given different forms of the equation.

· Students will be able to describe how slope relates to horizontal and vertical lines.

· Students will be able to relate similar triangles to slope. · Students will be able to identify a linear function from a table. · Students will be able to use proportional relationships to solve real world problems. · Students will be able to solve linear equations for desired variables and values.
Evidence of Learning
Formative Assessments: · Questioning Strategies used throughout the unit. · 5 Quizzes
Summative Assessment: · Cumulative Assessment
Pacing Guide

Topics	Timeframe
Topic #1: Linear Equations (8.2 in HM textbook) **Quiz #1**	1 day
Topic #2: Graphing Linear Equations Using Intercepts (8.3 in HM textbook) **Quiz #2**	2 days
Topic #3: Horizontal and Vertical Lines	1 day
Topic #4: Slope of a Line (8.4 in HM textbook) **Quiz #3**	1 day
Topic #5: Slope and Similar Triangles **Quiz #4**	1 day

Topic #7: Slope-Intercept Form (8.5 in HM textbook) Labs: Select one of the following - Connect Three - Slippery Slopes! - Marble Masters **Quiz #5**	2 days
Lab: Proportional Relationships Topic #8: Proportional Relationships	2 days
Topic #9: Solving Linear Equations	1 day
Review and Cumulative Assessment	2 days
Curriculum Development Resources: · https://njctl.org/courses/math/8th-grade-math/ · http://www.raftbayarea.org/ideas/Connect%20Three.pdf · http://www.raftbayarea.org/ideas/Slippery%20Slopes.pdf · HYPERLINK "http://www.raftbayarea.org/ideas/Marble%20Masters.pdf" http://www.raftbayarea.org/ideas/Marble%20Masters.pdf	

Pre-Algebra Math 7 Curriculum **Unit 6 Part 2**	
Title: Modeling Relationships	
Subject: Pre-Algebra Math 7	**Length of Time:** 1 week (5 days)
Unit 6 Part 2 Summary: Unit 5 Part 2 will allow students to interpret functions. They will also construct graphs from two quantities that form a linear relationship and describe the relationship using that graph.	

Learning Targets	
PARCC ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters	
Domain: Functions	
Cluster: Define, evaluate, and compare functions.	
Standard #s:	**Standards:**
8.F.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.
Cluster: Use functions to model relationships between quantities.	
8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally

Unit 6 Part 2 Essential Question:	**Unit 6 Part 2 Enduring Understanding:**
· What is a function? · Are properties of functions and graphs the same for all functions?	· The definition of a function and what it's graph represents. · The ability to graph a function and write a function from a graph.

Unit 6 Part 2 Objectives:

· Students will construct a function and determine the rate of change and initial value.

· Students will describe a functional relationship by examining a graph.

Evidence of Learning	
Formative Assessments: · Questioning strategies used throughout the unit. · 3 Quizzes	
Summative Assessment: · Cumulative Assessment	
Pacing Guide	
Topics	**Timeframe**
Topic #1: Interpreting with Functions **Quiz #1**	1 day
Topic #2: Analyzing a Graph **Quiz #2**	1 day
Topic #3: Comparing Different Representations of Functions **Quiz #3**	1 day
Review and Cumulative Assessment	2 days
Curriculum Development Resources: · HYPERLINK "https://njctl.org/courses/math/8th-grade-math/" https://njctl.org/courses/math/8th-grade-math/	

Pre-Algebra Math 7 Curriculum Unit 6 Part 3

Title: Functions	
Subject: Pre-Algebra Math 7	**Length of Time:** 2 weeks (10 days)
Unit 5 Part 3 Summary: Unit 5 Part 3 will allow students to understand how functions operate and relates to a graph. They will compare properties of two functions and represent functions in multiple ways. They will be introduced to slope-intercept form and recognize that the graph will be a straight line.	
Learning Targets	
PARCC ■ Major Clusters; ◘ Supporting Clusters; ○ Additional Clusters	
Domain: Functions	
Cluster: Define, evaluate, and compare functions.	
Standard #s:	**Standards:**
8.F.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
8.F.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.
Cluster: Use functions to model relationships between quantities	
Standard #s:	**Standards:**
8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Unit 6 Part 3 Essential Question: · What is a function? · How are functions represented? · What can a relationship between numbers tell about a problem?	**Unit 6 Part 3 Enduring Understanding:** · Properties of functions and their graphs are similar but not identical. · Slope-intercept form is an easy way of graphing functions.

Unit 6 Part 3 Objectives:

· Students will understand what a function is and its corresponding graph.

· Students will compare properties of different functions and relate the information to real world situations.

· Students will graph slope-intercept form of a line.

Evidence of Learning

Formative Assessments:

· Questioning strategies used throughout the unit.

· 3 Quizzes

Summative Assessment:

· Cumulative Assessment

Pacing Guide

Topics	Timeframe
Topic #1: Relationships and Functions (8.1 and 8.7 in HM text book) Lab – Intro to Functions (either group or individual)	2 days
Topic #2: Domain and Range (8.1 and Focus on Functions 8.6 Function Domain and Range in HM textbook) **Quiz #1**	2 days

Topic #3: Vertical Line Test (8.1 in HM text book) **Quiz #2**	2 days
Topic #4: Linear Vs. Non-Linear Functions (Focus on Functions 8.2 Linear and Non-Linear Functions in HM textbook) **Quiz #3**	2 days
Review and Cumulative Assessment	2 days
Curriculum Development Resources: · HYPERLINK "https://njctl.org/courses/math/8th-grade-math/" https://njctl.org/courses/math/8th-grade-math/	

Pre-Algebra Math 7 Curriculum **Unit 6 Part 4**	
Title: Data	
Subject: Pre-Algebra Math 7	**Length of Time:** 2 weeks (10 days)
Unit 6 Part 4: Unit 6 Part 4 will allow students to examine scatter plots and interpret data into a graph. They will be able to understand different patterns and lines of best fit within graphs. They will use linear models and two variable data to explain real life situations. They also will examine frequencies and bivariate data.	
Learning Targets	
PARCC ■ Major Clusters; ◘ Supporting Clusters; ○ Additional Clusters	
Domain: Statistics & Probability	
Cluster: Investigate patterns of association in bivariate data.	
Standard #s:	**Standards:**

8.SP.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association
8.SP.2	Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
8.SP.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.
8.SP.4	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?

Unit 5 Part 4 Essential Questions:	**Unit 5 Part 4 Enduring Understandings:**
· How can information from a problem be represented in a way to see a pattern or a frequency? · What is a line of best fit and how can it simply a conclusion? · Are interpretation and prediction an accurate conclusion for a problem?	· Scatter plots, line of best fit, and frequencies all help interpret data within a problem. · Patterns can be modeled using different graphs. · Straight lines are widely used to model relationships.

Unit 5 Part 4 Objectives:

· Student will be able to graph scatter plots.
· Students will interpret and examine data to come to a conclusion.
· Students will know about line of best fit and two variable data relationships.
· Students will understand patterns of association in bivariate categorical data.
· Students will use frequency to solve real life problems and make predictions for future ones.

Evidence of Learning

Formative Assessments:

· Questioning strategies used throughout the unit.

· 4 Quizzes	
Summative Assessment: · Cumulative Assessment	
Pacing Guide	
Topics	**Timeframe**
Topic #1: Two Variable Data Lab: RAFT – Stars on the HR Diagram **Quiz #1**	3 days
Topic #2: Line of Best Fit (8.6 in HM textbook) Lab: Illustrative Mathematics – Bird Eggs **Quiz #2**	3 days
Topic #3: Determining the Prediction Equation **Quiz #3**	4 days
Topic #4: Two Way Table Focus on Data Analysis 11.5 Two-Way Tables **Quiz #4**	3 days
Review and Cumulative Assessment	2 days
Curriculum Development Resources: · https://njctl.org/courses/math/8th-grade-math/ · http://www.raftbayarea.org/ideas/Stars%20on%20the%20HR%20Diagram.pdf · HYPERLINK "http://www.illustrativemathematics.org/illustrations/41" http://www.illustrativemathematics.org/illustrations/41	