Califon Public School
Curriculum

Subject:	Grade:	Unit #:	Pacing:
Pre-Algebra	7th	1	5 weeks

Unit Title: Number Systems and Operations

OVERVIEW OF UNIT:

This unit starts off with using number lines to help introduce students to the concept of adding and subtracting positive and negative numbers. Students will work on developing these skills and slowly introduce rational numbers into the process. Over the course of the unit, students will work on developing skills to compute sums, differences, products, and quotients of rational numbers in various contexts. Additionally, students will work on expressing rational numbers as decimals and eventually using properties to solve multi-step problems involving positive and negative rational numbers.

Big Ideas

- Use a number line to add and subtract positive and negative integers and rational numbers
- Solve real-world problems involving the addition and subtraction of positive and negative integers and of rational numbers
- Describe situations in which opposite quantities combine to make 0
- Solve multi-step real-world and mathematical problems involving the strategic use of operations on rational numbers
- Apply a variety of estimation strategies to check the reasonableness of answers to real-world problems
- Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients
- Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities are related

Essential Questions

- How can you use a number line to add and subtract positive and negative integers and rational numbers?
- How do you solve real-world problems involving addition and subtraction of positive and negative integers and of rational numbers?
- How would you describe situations in which opposite quantities combine to make 0?
- How are multi-step real world and mathematical problems involving the strategic use of operations on rational numbers solved?
- How can you apply a variety of estimation strategies to check the reasonableness of answers to real-world problems?
- How can you apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients?

- Why is it beneficial to rewrite an expression in different forms in a problem context when solving the problem?

Objectives

- Students will be able to use a number line to add and subtract positive integers.
- Students will be able to use a number line to add and subtract negative integers and then assess the results for reasonableness.
- Students will be able to use a number line to add and subtract rational numbers.
- Students will be able to calculate the sum of rational numbers.
- Students will be able to calculate the difference of rational numbers.
- Students will be able to develop rules to find products and quotients of rational numbers.
- Students will be able to express rational numbers as decimals.
- Students will be able to use products and quotients of rational numbers to solve problems
- Students will be able to use properties to solve multi-step problems involving positive and negative rational numbers.
- Students will be able to solve multi-step problems involving a combination of rational number operations.

Assessment

Formative Assessment:

- Homework Assignments
- Classwork
- Quizzes
- Skill Worksheets
- Class Discussions

Summative Assessment:

- Module Test
- Unit Test
- Performance Task

Benchmark:

- Link It Benchmark Assessment

Alternative:

- Performance Task
- Modified Tests (independently developed by teacher)
- Projects

Key Vocabulary

- degree
- opposites
- Addition Property of Opposites
- additive inverse
- absolute value
- inverse operations
- quotient
- equivalent fractions
- rational number

Resources & Materials

- Textbook (Into Math Accelerated Gr. 7)
- All Things Pre-Algebra
- Promethean Board
- Calculator

- Teacher-Made Materials
- Guided Notes
- Edpuzzle (www.edpuzzle.com)
- Online Games
- IXL (www.ixl.com/math)
- Khan Academy (www.khanacademy.org)
- HMH Online (https://www.hmhco.com/ui/#/dashboard)
- Desmos (www.desmos.com)
- Online Manipulatives (https://illuminations.nctm.org/)

Technology Infusion

Teacher Technology:

- Chromebook
- Promethean Board
- Edpuzzle
- Google Apps for Education
- Google Classroom

Student Technology:

- Google Classroom
- Chromebook
- IXL/Quizzizz/Blooket/Kahoot
- Edpuzzle

Activities:

- Students will use their Chromebooks to access Google Classroom and Edpuzzle to watch videos about math topics and write out explanations for how practice problems were solved or how the math connects to real-life situations.
- Students will use their Chromebooks to access websites like IXL, Khan Academy, Quizzizz, Blooket, Kahoot, etc. to practice and review the skills learned throughout the unit. They will also track their data to demonstrate progress and growth within specified topics.

Standard	Standard Description
8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.

Interdisciplinary Integration

Activities:

- Students will practice using the unit vocabulary as they talk and write about the problems they are solving. Understanding the vocabulary will aid their understanding of the concepts covered in this unit.

Resources:

- Quizlet

- Teacher Vision Cross-Curricular Theme Map - https://www.teachervision.com/teaching-methods/curriculum-planning/7167.html
- Engineering Go For It! - http://teachers.egfi-k12.org/
- US Department of Education STEM - http://www.ed.gov/stem
- What Every Educator Should Know About Using Google by Shell Education
- International Literacy Association Read Write Think - http://www.readwritethink.org/

Standard	Standard Description
NJSLS-ELA W.AW.7.1	Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.

21st Century Life Skills Standards

Activities:

- Students will work in groups to collaborate, at times taking leadership roles, to communicate project ideas to the whole class.

Standard	Student Learning Objectives
9.4.8.TL.6	Collaborate to develop and publish work that provides perspectives on a real-world problem.

Careers

Activities:

- Students will discuss and then write detailed explanations utilizing appropriate mathematical vocabulary to explain their thought process for obtaining solutions to specific problems

Practice	Description
Use technology to enhance productivity increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
Work productively in teams while using cultural/global competence.	Students positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.
Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of the problem and carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through this when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. Their own actions or the actions of others.

Standards for Mathematical Practice	
MP #	Practice
1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
4	Model with mathematics.
6	Attend to precision.
7	Look for and make use of structure.
8	Look for and express regularity in repeated reasoning.

Standards	
Standard #	**Standard Description**
7.RP.A	Analyze proportional relationships and use them to solve real-world and mathematical problems
7.RP.A.2	Recognize and represent proportional relationships between quantities.
7.RP.A.2c	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 $t = pn$.
7.RP.A.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.NS.A	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers
7.NS.A.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.A.1a	Describe situations in which opposite quantities combine to make 0. For example, in the first round of a game, Maria scored 20 points. In the second round of the same game, she lost 20 points. What is her score at the end of the second round?
7.NS.A.1b	Understand $p + q$ as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
7.NS.A.1c	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
7.NS.A.1d	Apply properties of operations as strategies to add and subtract rational numbers.
7.NS.A.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
7.NS.A.2a	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly

	the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
7.NS.A.2b	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If q and q are integers, then $-\left(\frac{p}{q}\right)=\frac{(-p)}{q}=\frac{p}{(-q)}$. Interpret quotients of rational numbers by describing real world contexts.
7.NS.A.2c	Apply properties of operations as strategies to multiply and divide rational numbers.
7.NS.A.2d	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers. (Clarification: Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)
7.EE.A	Use properties of operations to generate equivalent expressions
7.EE.A.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.A.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.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations
7.EE.B.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 $\frac{1}{10}$ of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.A	Work with radicals and integer exponents
8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2\times3^{-5}=3^{-3}=\frac{1}{3^3}=\frac{1}{27}$.

Differentiation
Students with 504 plans
• Preferential seating

- Guided notes
- Extra time
- Teacher check-ins
- Use graphic organizers
- Redirect attention
- Prioritize tasks
- Small group testing
- Provide modifications & accommodations per individual student's 504 plan

Special Education

- Provide modifications & accommodations as listed in the student's IEP
- Position the student near a helping peer or have quick access to the teacher
- Modify or reduce assignments/tasks
- Reduce the length of the assignment for different modes of delivery
- Increase one-to-one time
- Prioritize tasks
- Use graphic organizers
- Use online resources for skill-building
- Provide teacher notes
- Use collaborative grouping strategies, such as small groups
- NJDOE resources - http://www.state.nj.us/education/specialed/

Response to Intervention (RTI)

- Tiered interventions following the RTI framework
- Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/
- Intervention Central - http://www.interventioncentral.org/

English Language Learners (ELL)

- Provide text-to-speech
- Use of a translation dictionary or software
- Provide graphic organizers
- NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm
- Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm

Enrichment

- Process should be modified: higher order thinking skills, open-ended thinking, discovery
- Utilize project-based learning for greater depth of knowledge
- Utilize exploratory connections to higher-grade concepts
- Contents should be modified: real-world problems, audiences, deadlines, evaluations, transformations
- Learning environments should be modified: student-centered learning, independence, openness, complexity, and groups should be varied
- NJDOE resources

Califon Public School
Curriculum

Subject:	Grade:	Unit #:	Pacing:
Pre-Algebra	7th	2	4 weeks

Unit Title: Ratios and Proportional Reasoning

OVERVIEW OF UNIT:

This unit builds upon students' prior knowledge of ratios, rates, and unit rates to further develop proportional relationships in equations, tables, and graphs. They will explore relationships using tables of values, graphs in the coordinate plane, and equations. This will lead to determining whether a proportional relationship exists, and if so, students will specify that relationship. The unit then moves to reviewing percents and introducing common applications of percent change. Markup, markdown, taxes, and gratuities are used to demonstrate how writing an expression in different forms provides different information about the problem presented.

Big Ideas

- Decide whether two quantities are in a proportional relationship
- Identify the constant of proportionality (unit rate)
- Represent proportional relationships by equations
- Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation
- Use proportional relationships to solve multi-step problems
- Find a percent of a quantity as a rate per 100
- Solve problems involving finding the whole, given a part, and the percent
- Use percent, rate, and ratios to solve real-world mathematical problems
- Use proportional reasoning to calculate percent increase, percent decrease, markups, markdowns, taxes, gratuities, commissions, fees, simple interest, and the total value of an account
- Represent markups, markdowns, retail prices, discount prices, taxes, gratuity, total cost, commissions, and fees by equations of the form y = kx by applying proportional reasoning
- Rewrite an expression in different forms to shed light on how the quantities in it are related

Essential Questions

- How can you decide whether two quantities are in a proportional relationship?
- How can you identify the constant of proportionality (unit rate)?
- How are proportional relationships represented by equations?
- What does the point (x, y) on the graph of a proportional relationship mean in terms of the situation?
- How can you use proportional relationships to solve multi-step problems?
- How can you find a percent of a quantity as a rate per 100?
- How do you solve problems involving finding the whole, given a part, and the percent?
- How do you use percentages, rates, and ratios to solve real-world and mathematical problems?

- How can you use proportional reasoning to calculate percent increase, percent decrease, markups, markdowns, taxes, gratuities, commissions, fees, simple interest, and the total value of an account?
- How can you represent markups, markdowns, retail prices, discount prices, taxes, gratuity, total cost, commissions, and fees by equations of the form $y = kx$ by applying proportional reasoning?
- How is proportional reasoning used to assess the reasonableness of answers?
- How can you rewrite an expression in different forms to demonstrate how the quantities in it are related?

Objectives

- Students will be able to use patterns and unit rates to analyze and describe relationships.
- Students will be able to determine if a relationship represented in a table is proportional.
- Students will be able to identify the constant of proportionality.
  Students will be able to write an equation in the form $y = kx$.
- Students will be able to identify the characteristics of a proportional relationship when graphed.
- Students will be able to use a proportional relationship to solve multi-step problems.
- Students will be able to write a ratio as a percent.
- Students will be able to find a percent of a quantity.
- Students will be able to use percents to solve real-world problems.
- Students will be able to use proportional reasoning to calculate the percent increase or decrease.
- Students will be able to calculate markups, markdowns, retail prices, and discount prices, and represent them using equations of the form $y = kx$.
- Students will be able to represent taxes, gratuities, and total cost using equations in the form $y = kx$ by applying proportional reasoning.
- Students will be able to use the equation $y = kx$ to solve problems and assess the reasonableness of answers.
- Students will be able to use proportional reasoning to find total earnings for someone earning a base salary plus a commission.
- Students will be able to use proportional reasoning to find fees (including fees as a percent and as a constant) and assess the reasonableness of answers.

Assessment

Formative Assessment:

- Homework Assignments
- Classwork
- Quizzes
- Skill Worksheets
- Class Discussions

Summative Assessment:

- Module Test
- Unit Test
- Performance Task

Benchmark:

- Link It Benchmark Assessment

Alternative:

- Performance Task
- Modified Tests (independently developed by teacher)
- Projects

Key Vocabulary	
• Constant of Proportionality • proportional relationship • unit rate • percent • percent change • percent decrease • percent increase • markdown • markup	• retail price • gratuity • sales tax • tip • commission • fee • principal • simple interest

Resources & Materials

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- Google Classroom

Student Technology:

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Resources:

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- US Department of Education STEM - http://www.ed.gov/stem
- What Every Educator Should Know About Using Google by Shell Education
- International Literacy Association Read Write Think - http://www.readwritethink.org/

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Standards for Mathematical Practice	
MP #	Practice
1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
5	Use appropriate tools strategically.
6	Attend to precision.
7	Look for and make use of structure.

Standards	
Standard #	**Standard Description**
7.RP.A	Analyze proportional relationships and use them to solve real-world and mathematical problems
7.RP.A.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $(\frac{1}{2})/(\frac{1}{4})$ miles per hour, equivalently 2 miles per hour.
7.RP.A.2	Recognize and represent proportional relationships between quantities.

7.RP.A.2a	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.
7.RP.A.2b	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
7.RP.A.2c	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 $t = pn$.
7.RP.A.2d	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.A.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.NS.A	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers
7.NS.A.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
7.NS.A.2a	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
7.NS.A.2b	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If q and q are integers, then $-\left(\frac{p}{q}\right) = \frac{(-p)}{q} = \frac{p}{(-q)}$. Interpret quotients of rational numbers by describing real world contexts.
7.NS.A.2c	Apply properties of operations as strategies to multiply and divide rational numbers.
7.EE.A	Use properties of operations to generate equivalent expressions
7.EE.A.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.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations
7.EE.B.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 $\frac{1}{10}$ of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is

	$27\frac{1}{2}$ 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.

Differentiation
Students with 504 plans
• Preferential seating • Guided notes • Extra time • Teacher check-ins • Use graphic organizers • Redirect attention • Prioritize tasks • Small group testing • Provide modifications & accommodations per individual student's 504 plan
Special Education
• Provide modifications & accommodations as listed in the student's IEP • Position the student near a helping peer or have quick access to the teacher • Modify or reduce assignments/tasks • Reduce the length of the assignment for different modes of delivery • Increase one-to-one time • Prioritize tasks • Use graphic organizers • Use online resources for skill-building • Provide teacher notes • Use collaborative grouping strategies, such as small groups • NJDOE resources - http://www.state.nj.us/education/specialed/
Response to Intervention (RTI)
• Tiered interventions following the RTI framework • Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/ • Intervention Central - http://www.interventioncentral.org/
English Language Learners (ELL)
• Provide text-to-speech • Use of a translation dictionary or software • Provide graphic organizers • NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm • Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm
Enrichment
• Process should be modified: higher order thinking skills, open-ended thinking, discovery • Utilize project-based learning for greater depth of knowledge

- Utilize exploratory connections to higher-grade concepts
- Contents should be modified: real-world problems, audiences, deadlines, evaluations, transformations
- Learning environments should be modified: student-centered learning, independence, openness, complexity, and groups should be varied

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Curriculum

Subject:	Grade:	Unit #:	Pacing:
Pre-Algebra	7th	3	5 weeks

Unit Title: Equations and Inequalities in One Variable

OVERVIEW OF UNIT:

This unit starts off by building upon students' knowledge about expressions and equations. Students will develop skills to write and solve multi-step one-variable linear equations and how to interpret the solutions to these equations. They will then apply these skills to multi-step problems involving supplementary, complementary, vertical, and adjacent angles. In the next part of this unit, students will build on their prior knowledge of inequalities to solve both one- and two-step inequalities. Students will have the opportunity to apply properties of inequalities to solve inequalities and discover how they use inverse operations to find solutions. Additionally, they will solve real-world and mathematical problems using inequalities.

Big Ideas

- Write and solve multi-step one-variable linear equations
- Interpret solutions of linear equations in context
- Explore and interpret equations
- Solve real-world problems involving multi-step linear equations in one variable
- Use supplementary, complementary, vertical, and adjacent angles in multi-step problems
- Solve one- and two-step inequalities for real-world problems
- Write and solve inequalities in the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers
- Graph the solution set of inequalities and interpret them in the context of the problem

Essential Questions

- How are multi-step one-variable linear equations written and solved?
- How do you interpret solutions of linear equations in their given context?
- How are equations interpreted?
- How are real-world multi-step linear equations in one variable problems solved?
- How are supplementary, complementary, adjacent, and vertical angles used in multi-step problems?
- What steps do you follow when solving one- and two-step inequalities for real-world problems?
- How do you write and solve inequalities in the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers?
- How do you graph the solution sets of inequalities and interpret them in the context of the problem?

Objectives

- Students will be able to represent a real-world situation with an equation.
- Students will be able to solve real-world situations using an equation.

- Students will be able to use algebraic properties to solve one-variable linear equations.
- Students will be able to recognize and interpret linear equations that have no solution or infinitely many solutions.
- Students will be able to solve and apply linear equations in one variable.
- Students will be able to apply properties to solve one-step inequalities.
- Students will be able to write two-step inequalities to represent situations.
- Students will be able to write, solve, and graph one-step and two-step inequalities to solve problems in context.

Assessment

Formative Assessment:

- Homework Assignments
- Classwork
- Quizzes
- Skill Worksheets
- Class Discussions

Summative Assessment:

- Module Test
- Unit Test
- Performance Task

Benchmark:

- Link It Benchmark Assessment

Alternative:

- Performance Task
- Modified Tests (independently developed by teacher)
- Projects

Key Vocabulary

- coefficient
- common denominator
- Distributive Property
- isolate the variable
- like terms
- multiple
- solution of an equation
- substitute
- adjacent angles
- complementary angles
- infinitely many solutions
- no solution
- supplementary angles
- vertical angles
- inequality
- number line
- solution of an inequality
- rate of change

Resources & Materials

- Textbook (Into Math Accelerated Gr. 7)
- All Things Pre-Algebra
- Promethean Board
- Calculator
- Teacher-Made Materials
- Guided Notes
- Edpuzzle (www.edpuzzle.com)
- Online Games
- IXL (www.ixl.com/math)

- Khan Academy (www.khanacademy.org)
- HMH Online (https://www.hmhco.com/ui/#/dashboard)
- Desmos (www.desmos.com)
- Online Manipulatives (https://illuminations.nctm.org/)

Technology Infusion

Teacher Technology:

- Chromebook
- Promethean Board
- Edpuzzle
- Google Apps for Education
- Google Classroom

Student Technology:

- Google Classroom
- Chromebook
- IXL/Quizzizz/Blooket/Kahoot
- Edpuzzle

Activities:

- Students will use their Chromebooks to access Google Classroom and Edpuzzle to watch videos about math topics and write out explanations for how practice problems were solved or how the math connects to real-life situations.
- Students will use their Chromebooks to access websites like IXL, Khan Academy, Quizzizz, Blooket, Kahoot, etc. to practice and review the skills learned throughout the unit. They will also track their data to demonstrate progress and growth within specified topics.

Standard	Standard Description
8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.

Interdisciplinary Integration

Activities:

- Students will practice using the unit vocabulary as they talk and write about the problems they are solving. Understanding the vocabulary will aid their understanding of the concepts covered in this unit.

Resources:

- Quizlet
- Teacher Vision Cross-Curricular Theme Map - https://www.teachervision.com/teaching-methods/curriculum-planning/7167.html
- Engineering Go For It! - http://teachers.egfi-k12.org/
- US Department of Education STEM - http://www.ed.gov/stem
- What Every Educator Should Know About Using Google by Shell Education

● International Literacy Association Read Write Think - http://www.readwritethink.org/

Standard	Standard Description
NJSLS-ELA W.AW.7.1	Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.

21st Century Life Skills Standards	
Activities: ● Students will work in groups to collaborate, at times taking leadership roles, to communicate project ideas to the whole class.	
Standard	**Student Learning Objectives**
9.4.8.TL.6	Collaborate to develop and publish work that provides perspectives on a real-world problem.

Careers	
Activities: ● Students will discuss and then write detailed explanations utilizing appropriate mathematical vocabulary to explain their thought process for obtaining solutions to specific problems	
Practice	**Description**
Use technology to enhance productivity increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
Work productively in teams while using cultural/global competence.	Students positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.
Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of the problem and carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through this when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. Their own actions or the actions of others.

Standards for Mathematical Practice	
MP #	Practice
1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
4	Model with mathematics.

6	Attend to precision.
7	Look for and make use of structure.

Standards	
Standard #	**Standard Description**
7.EE.A	Use properties of operations to generate equivalent expressions
7.EE.A.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations
7.EE.B.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 $\frac{1}{10}$ of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.B.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.EE.B.4a	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms with accuracy and efficiency. 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?
7.EE.B.4b	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are 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.
7.RP.A	Analyze proportional relationships and use them to solve real-world and mathematical problems
7.RP.A.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person

	walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $(\frac{1}{2})/(\frac{1}{4})$ miles per hour, equivalently 2 miles per hour.
7.G.A	Draw, construct, and describe geometrical figures and describe the relationships between them
7.G.A.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.
7.G.A.2	Draw (with technology, with ruler and protractor, as well as freehand) 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.B	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume
7.G.B.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.
8.EE.C	Analyze and solve linear equations and pairs of simultaneous linear equations
8.EE.C.7	Solve linear equations in one variable.
8.EE.C.7a	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).
8.EE.C.7b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
8.G.A	Understand congruence and similarity using physical models, transparencies, or geometry software
8.G.A.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.A.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

Differentiation
Students with 504 plans
• Preferential seating • Guided notes

- Extra time
- Teacher check-ins
- Use graphic organizers
- Redirect attention
- Prioritize tasks
- Small group testing
- Provide modifications & accommodations per individual student's 504 plan

Special Education

- Provide modifications & accommodations as listed in the student's IEP
- Position the student near a helping peer or have quick access to the teacher
- Modify or reduce assignments/tasks
- Reduce the length of the assignment for different modes of delivery
- Increase one-to-one time
- Prioritize tasks
- Use graphic organizers
- Use online resources for skill-building
- Provide teacher notes
- Use collaborative grouping strategies, such as small groups
- NJDOE resources - http://www.state.nj.us/education/specialed/

Response to Intervention (RTI)

- Tiered interventions following the RTI framework
- Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/
- Intervention Central - http://www.interventioncentral.org/

English Language Learners (ELL)

- Provide text-to-speech
- Use of a translation dictionary or software
- Provide graphic organizers
- NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm
- Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm

Enrichment

- Process should be modified: higher order thinking skills, open-ended thinking, discovery
- Utilize project-based learning for greater depth of knowledge
- Utilize exploratory connections to higher-grade concepts
- Contents should be modified: real-world problems, audiences, deadlines, evaluations, transformations
- Learning environments should be modified: student-centered learning, independence, openness, complexity, and groups should be varied
- NJDOE resources

Califon Public School
Curriculum

Subject:	Grade:	Unit #:	Pacing:
Pre-Algebra	7th	4	5 weeks

Unit Title: Similarity, Slope, and Linear Functions

OVERVIEW OF UNIT:

This unit starts off by looking at similarity in triangles to help develop an understanding of relationships among angles in triangles and their connections. It also looks at using angle relationships to explore parallel lines cut by a transversal. The unit then moves into proportional relationships and uses the students' knowledge about similar triangles to introduce the concept of slope. The students will work to derive the equation $y = mx$ and graph, interpret, and compare proportional relationships using the slope. This leads into a study of functions and the equations $y = mx + b$ to describe linear functions. Students will also construct and compare linear functions and examine nonlinear functions. The unit wraps up by studying systems of equations and how to solve them using various strategies.

Big Ideas

- Establish facts about the angle sum and exterior angle of triangles
- Use angle measures to determine whether two triangles are similar
- Show that corresponding angles, alternate exterior angles, and alternate interior angles are congruent, and that same-side interior or exterior angles are supplementary
- Use these facts to find missing angle measures
- Use similar triangles to understand slope
- Derive the equations $y = mx$
- Write an equation of a proportional relationship
- Graph proportional relationships
- Identify and use unit rates
- Compare proportional relationships presented in different representations
- Learn to identify functions and give examples of functions that are not linear
- Use functions to solve real-world problems
- Derive and interpret $y = mx + b$
- Interpret the meaning of the slope and y-intercept in a context
- Construct a function
- Compare functions
- Sketch, analyze, and describe a graph that exhibits the qualitative features of a function
- Use graphing to determine the approximate solution to a system
- Solve systems of linear equations by graphing, substitution, and elimination
- Learn to recognize and interpret graphic and algebraic results of solving a system with no solution or infinitely many solutions
- Use systems of two linear equations to represent real-world problems

Essential Questions
• What are some important aspects of angle sum and exterior angles of triangles to know? • How are angle measures used to determine whether two triangles are similar? • How can you show that corresponding angles, alternate exterior angles, and alternate interior angles are congruent? • How can you show that same-side interior or exterior angles are supplementary? • How is this knowledge about angles used to find missing angle measures? • How are similar triangles used to explain slope? • What is the equation y = mx used for and does it mean? • How do you write an equation of a proportional relationship? • How do you graph a proportional relationship? • How can you identify and use unit rates? • How do you compare proportional relationships presented in different representations? • How can you identify functions? • What are some examples of functions that are not linear? • How do you derive and interpret y = mx + b? • What is the meaning of the slope and y-intercept in a context? • How do you construct a function? • How do you compare functions? • How do you sketch, analyze, and describe a graph that exhibits the qualitative features of a function? • How is graphing used to determine an approximate solution to a system? • How are systems of linear equations solved by graphing, substitution, and elimination? • How can you recognize and interpret graphic and algebraic results of solving a system with no solution or infinitely many solutions? • How are systems of two linear equations used to represent real-world problems?

Objectives
• Students will be able to use angle relationships in triangles. • Students will be able to identify whether two triangles are similar when given angle measures in the triangles. • Students will be able to find unknown angle measures in triangles known to be similar. • Students will be able to find unknown angle measures when parallel lines are cut by a transversal. • Students will be able to relate right triangles to the coordinates of a line going through the origin. • Students will be able to compare persistent features of the triangles to persistent features of the line. • Students will be able to write the equation of a proportional relationship. • Students will be able to graph proportional relationships. • Students will be able to interpret unit rate as the slope of the graph of a proportional relationship. • Students will be able to display a relationship between two variables. • Students will be able to write the equation of a linear function. • Students will be able to interpret the slope and y-intercept of a linear function. • Students will be able to construct a function to model, understand, and analyze a linear relationship. • Students will be able to sketch and analyze a graph that exhibits the qualitative features of a function.

- Students will be able to interpret the graphical representation of two linear equations.
- Students will be able to solve a system of two linear equations by graphing.

Assessment

Formative Assessment:

- Homework Assignments
- Classwork
- Quizzes
- Skill Worksheets
- Class Discussions

Summative Assessment:

- Module Test
- Unit Test
- Performance Task

Benchmark:

- Link It Benchmark Assessment

Alternative:

- Performance Task
- Modified Tests (independently developed by teacher)
- Projects

Key Vocabulary

- Angle-Angle Similarity Postulate
- Exterior Angle Theorem
- Triangle Sum Theorem
- alternate interior angles
- corresponding angles
- exterior angle
- remote interior angle
- same-side exterior angles
- transversal
- unit rate
- continuous graph
- discrete graph
- hypotenuse
- legs
- linear equation
- rise
- run
- slope
- y = mx
- domain
- function
- input
- linear function
- nonlinear function
- output
- range
- relation
- slope-intercept form
- vertical line test
- y-intercept
- equivalent expressions
- substitute
- elimination
- solution of a system of equations
- system of equations

Resources & Materials

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Standard	Standard Description
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Interdisciplinary Integration

Activities:

- Students will practice using the unit vocabulary as they talk and write about the problems they are solving. Understanding the vocabulary will aid their understanding of the concepts covered in this unit.

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- Engineering Go For It! - http://teachers.egfi-k12.org/
- US Department of Education STEM - http://www.ed.gov/stem
- What Every Educator Should Know About Using Google by Shell Education
- International Literacy Association Read Write Think - http://www.readwritethink.org/

Standard	Standard Description
NJSLS-ELA W.AW.7.1	Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.

21st Century Life Skills Standards

Activities:

- Students will work in groups to collaborate, at times taking leadership roles, to communicate project ideas to the whole class.

Standard	Student Learning Objectives
9.4.8.TL.6	Collaborate to develop and publish work that provides perspectives on a real-world problem.

Careers

Activities:

- Students will discuss and then write detailed explanations utilizing appropriate mathematical vocabulary to explain their thought process for obtaining solutions to specific problems

Practice	Description
Use technology to enhance productivity increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
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Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of the problem and carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through this when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. Their own actions or the actions of others.

Standards for Mathematical Practice

MP #	Practice
1	Make sense of problems and persevere in solving them.

2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
6	Attend to precision.
7	Look for and make use of structure.
8	Look for and express regularity in repeated reasoning.

Standards	
Standard #	**Standard Description**
7.EE.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations
7.EE.B.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.EE.B.4a	Solve word problems leading to equations of the form $px + q$ = r and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms with accuracy and efficiency. 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?
7.EE.B.4b	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are 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.
7.G.A	Draw, construct, and describe geometrical figures and describe the relationships between them
7.G.A.2	Draw (with technology, with ruler and protractor, as well as freehand) 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.B	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume
7.G.B.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.
8.F.A	Define, evaluate and compare functions
8.F.A.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. (Clarification: Function notation is not required in Grade 8)
8.F.A.2	Compare properties (e.g. rate of change, intercepts, domain and range) 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.A.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.B	Use functions to model relationships between quantities
8.F.B.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.B.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.G.A	Understand congruence and similarity using physical models, transparencies, or geometry software
8.G.A.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.A.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
8.G.A.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.A.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.EE.B	Understand the connections between proportional relationships, lines, and linear equations
8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
8.EE.B.6	Use similar triangles to explain why the slope 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.EE.C	Analyze and solve linear equations and pairs of simultaneous linear equations
8.EE.C.7	Solve linear equations in one variable.
8.EE.C.7a	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).
8.EE.C.7b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
8.EE.C.8	Analyze and solve pairs of simultaneous linear equations.
8.EE.C.8a	Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
8.EE.C.8b	Solve systems of two linear equations in two variables using the substitution method and estimate solutions by graphing the equations. Solve simple cases by inspection. For example: by inspection, conclude that $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6. Solve and using the substitution method; Solve $y = 3x + 1$ and $y = -2x + 7$ using the substitution method.
8.EE.C.8c	Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.

Differentiation
Students with 504 plans
• Preferential seating • Guided notes • Extra time • Teacher check-ins • Use graphic organizers • Redirect attention • Prioritize tasks • Small group testing • Provide modifications & accommodations per individual student's 504 plan
Special Education
• Provide modifications & accommodations as listed in the student's IEP • Position the student near a helping peer or have quick access to the teacher • Modify or reduce assignments/tasks • Reduce the length of the assignment for different modes of delivery • Increase one-to-one time

- Prioritize tasks
- Use graphic organizers
- Use online resources for skill-building
- Provide teacher notes
- Use collaborative grouping strategies, such as small groups
- NJDOE resources - http://www.state.nj.us/education/specialed/

Response to Intervention (RTI)

- Tiered interventions following the RTI framework
- Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/
- Intervention Central - http://www.interventioncentral.org/

English Language Learners (ELL)

- Provide text-to-speech
- Use of a translation dictionary or software
- Provide graphic organizers
- NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm
- Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm

Enrichment

- Process should be modified: higher order thinking skills, open-ended thinking, discovery
- Utilize project-based learning for greater depth of knowledge
- Utilize exploratory connections to higher-grade concepts
- Contents should be modified: real-world problems, audiences, deadlines, evaluations, transformations
- Learning environments should be modified: student-centered learning, independence, openness, complexity, and groups should be varied
- NJDOE resources

Califon Public School
Curriculum

Subject:	Grade:	Unit #:	Pacing:
Pre-Algebra	7th	5	4 weeks

Unit Title: Applications of Real Numbers and Exponents

OVERVIEW OF UNIT:

At the start of this unit, students work with rational and irrational numbers. This will build upon their prior knowledge about the relationship between fractions and decimals. They will also work on investigating square and cube roots. Additionally, they will order lists of real numbers consisting of both rational and irrational numbers. The next part of the unit builds upon what students have learned about irrational numbers and roots by introducing the Pythagorean Theorem. They will work on proving the Pythagorean Theorem and its converse, which will then move into using the Pythagorean Theorem to determine distances between two points. The unit finishes out by working with integer exponents and then moves into writing, comparing, and computing with numbers written in scientific notation.

Big Ideas

- Determine whether a number is rational or irrational
- Write rational numbers as decimals or fractions
- Evaluate square roots and cube roots and solve equations
- Identify decimal estimates of square roots and cube roots
- Compare numerical expressions involving roots
- Order a list of real numbers including rational and irrational numbers
- Prove the Pythagorean Theorem and its converse
- Solve basic problems using the Pythagorean Theorem
- Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions
- Apply the Pythagorean Theorem to determine the distance between two points on the coordinate plane
- Develop the properties of integer exponents
- Use the properties of integer exponents to simplify expressions and solve problems
- Translate between standard notation and scientific notation or vice versa
- Compare and compute numbers using scientific notation

Essential Questions

- How can you determine whether a number is rational or irrational?
- How can you write rational numbers as decimals or fractions?
- How do you evaluate square and cube roots?
- How do you solve equations involving square and cube roots?
- What steps need to be followed to identify decimal estimates of square and cube roots?

- How do you compare numerical expressions involving roots?
- How can you order a list of real numbers including rational and irrational numbers?
- How can you prove the Pythagorean Theorem and its converse?
- How is the Pythagorean Theorem used to solve basic problems?
- In what ways can you apply the Pythagorean Theorem to determine unknown side lengths in right triangles?
- In what ways can you apply the Pythagorean Theorem to determine the distance between two points on the coordinate plane?
- What are the properties of integer exponents?
- How are the properties of integer exponents used to simplify expressions and solve problems?
- How do you translate between standard notation and scientific notation?
- How do you translate between scientific notation and standard notation?
- How do you compare numbers using scientific notation?
- How do you work with numbers using scientific notation?

Objectives

- Students will be able to determine if a number is rational.
- Students will be able to evaluate square roots.
- Students will be able to evaluate cube roots.
- Students will be able to order a list of real numbers consisting of both rational and irrational numbers.
- Students will be able to prove and apply the Pythagorean Theorem and its converse.
- Students will be able to use the Pythagorean Theorem to solve real-world problems involving right triangles.
- Students will be able to use the Pythagorean Theorem to determine the distance between any two points in the coordinate plane.
- Students will be able to develop and use the properties of integer exponents.
- Students will be able to express numbers using scientific notation.
- Students will be able to compute with numbers written in scientific notation.

Assessment

Formative Assessment:

- Homework Assignments
- Classwork
- Quizzes
- Skill Worksheets
- Class Discussions

Summative Assessment:

- Module Test
- Unit Test
- Performance Task

Benchmark:

- Link It Benchmark Assessment

Alternative:

- Performance Task
- Modified Tests (independently developed by teacher)
- Projects

Key Vocabulary	
• rational number	• real numbers
• repeating decimal	• Pythagorean Theorem
• terminating decimal	• Pythagorean triple
• irrational number	• cone
• cube	• base
• cube root	• exponent
• perfect cube	• power
• perfect square	• properties of exponents
• principal square root	• scientific notation
• radical symbol	• standard form of a number
• square root	

Resources & Materials

- Textbook (Into Math Accelerated Gr. 7)
- All Things Pre-Algebra
- Promethean Board
- Calculator
- Teacher-Made Materials
- Guided Notes
- Edpuzzle (www.edpuzzle.com)
- Online Games
- IXL (www.ixl.com/math)
- Khan Academy (www.khanacademy.org)
- HMH Online (https://www.hmhco.com/ui/#/dashboard)
- Desmos (www.desmos.com)
- Online Manipulatives (https://illuminations.nctm.org/)

Technology Infusion

Teacher Technology:

- Chromebook
- Promethean Board
- Edpuzzle
- Google Apps for Education
- Google Classroom

Student Technology:

- Google Classroom
- Chromebook
- IXL/Quizzizz/Blooket/Kahoot
- Edpuzzle

Activities:

- Students will use their Chromebooks to access Google Classroom and Edpuzzle to watch videos about math topics and write out explanations for how practice problems were solved or how the math connects to real-life situations.
- Students will use their Chromebooks to access websites like IXL, Khan Academy, Quizzizz, Blooket, Kahoot, etc. to practice and review the skills learned throughout the unit. They will also track their data to demonstrate progress and growth within specified topics.

Standard	Standard Description
8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.

Interdisciplinary Integration

Activities:

- Students will practice using the unit vocabulary as they talk and write about the problems they are solving. Understanding the vocabulary will aid their understanding of the concepts covered in this unit.

Resources:

- Quizlet
- Teacher Vision Cross-Curricular Theme Map - https://www.teachervision.com/teaching-methods/curriculum-planning/7167.html
- Engineering Go For It! - http://teachers.egfi-k12.org/
- US Department of Education STEM - http://www.ed.gov/stem
- What Every Educator Should Know About Using Google by Shell Education
- International Literacy Association Read Write Think - http://www.readwritethink.org/

Standard	Standard Description
NJSLS-ELA W.AW.7.1	Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.

21st Century Life Skills Standards

Activities:

- Students will work in groups to collaborate, at times taking leadership roles, to communicate project ideas to the whole class.

Standard	Student Learning Objectives
9.4.8.TL.6	Collaborate to develop and publish work that provides perspectives on a real-world problem.

Careers

Activities:

- Students will discuss and then write detailed explanations utilizing appropriate mathematical vocabulary to explain their thought process for obtaining solutions to specific problems

Practice	Description

Use technology to enhance productivity increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
Work productively in teams while using cultural/global competence.	Students positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.
Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of the problem and carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through this when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. Their own actions or the actions of others.

Standards for Mathematical Practice	
MP #	Practice
1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
5	Use appropriate tools strategically.
6	Attend to precision.
7	Look for and make use of structure.
8	Look for and express regularity in repeated reasoning.

Standards	
Standard #	**Standard Description**
7.EE.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations
7.EE.B.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 $\frac{1}{10}$ of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.B.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.EE.B.4a	Solve word problems leading to equations of the form $px + q$ = r and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms with accuracy and efficiency. 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?
8.F.A	Define, evaluate and compare functions
8.F.A.2	Compare properties (e.g. rate of change, intercepts, domain and range) 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.SP.A	Investigate patterns of association in bivariate data
8.SP.A.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.G.A	Understand congruence and similarity using physical models, transparencies, or geometry software
8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations:
8.G.A.1a	Lines are transformed to lines, and line segments to line segments of the same length.
8.G.A.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.B	Understand and apply the Pythagorean Theorem
8.G.B.6	Explain a proof of the Pythagorean Theorem and its converse.
8.G.B.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.B.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
8.NS.A	Know that there are numbers that are not rational and approximate them by rational numbers

8.NS.A.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually and convert a decimal expansion which repeats eventually into a rational number.
8.NS.A.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). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.
8.NS.A.3	Understand that the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.
8.EE.A	Work with radicals and integer exponents
8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$.
8.EE.A.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$ where p is a positive rational number.
8.EE.A.2a	Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
8.EE.A.2b	Simplify numerical radicals, limiting to square roots (i.e. nonperfect squares). For example, simplify $\sqrt{8}$ to $2\sqrt{2}$.
8.EE.A.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9 and determine that the world population is more than 20 times larger.
8.EE.A.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.
8.EE.B	Understand the connections between proportional relationships, lines, and linear equations
8.EE.B.6	Use similar triangles to explain why the slope 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.EE.C	Analyze and solve linear equations and pairs of simultaneous linear equations
8.EE.C.7	Solve linear equations in one variable.

8.EE.C.7b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
8.EE.C.8	Analyze and solve pairs of simultaneous linear equations.
8.EE.C.8a	Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

Differentiation
Students with 504 plans
• Preferential seating • Guided notes • Extra time • Teacher check-ins • Use graphic organizers • Redirect attention • Prioritize tasks • Small group testing • Provide modifications & accommodations per individual student's 504 plan
Special Education
• Provide modifications & accommodations as listed in the student's IEP • Position the student near a helping peer or have quick access to the teacher • Modify or reduce assignments/tasks • Reduce the length of the assignment for different modes of delivery • Increase one-to-one time • Prioritize tasks • Use graphic organizers • Use online resources for skill-building • Provide teacher notes • Use collaborative grouping strategies, such as small groups • NJDOE resources - http://www.state.nj.us/education/specialed/
Response to Intervention (RTI)
• Tiered interventions following the RTI framework • Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/ • Intervention Central - http://www.interventioncentral.org/
English Language Learners (ELL)
• Provide text-to-speech • Use of a translation dictionary or software • Provide graphic organizers • NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm

- Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm

Enrichment

- Process should be modified: higher order thinking skills, open-ended thinking, discovery
- Utilize project-based learning for greater depth of knowledge
- Utilize exploratory connections to higher-grade concepts
- Contents should be modified: real-world problems, audiences, deadlines, evaluations, transformations
- Learning environments should be modified: student-centered learning, independence, openness, complexity, and groups should be varied
- NJDOE resources

Califon Public School
Curriculum

Subject:	Grade:	Unit #:	Pacing:
Pre-Algebra	7th	6	4 weeks

Unit Title: Area and Volume

OVERVIEW OF UNIT:

This unit has students investigating circles and other shapes to derive the formulas for area and use them to solve problems. Students will also work with the circumference formula for circles before moving into calculating the area of composite figures. The next part of the unit focuses on cross sections of solids before moving into deriving and applying formulas for surface area and volume of cubes and right prisms. The unit continues by studying how to calculate the volume of cylinders, cones, and spheres. It wraps up by having students take all of this information and apply it to solving multi-step problems with surface area and volume.

Big Ideas

- Know and use the formulas for the circumference and area of a circle to solve problems
- Solve multi-step real-life and mathematical problems involving rational numbers
- Calculate the area of a composite figure
- Describe the two-dimensional figures that result from slicing three-dimensional figures
- Solve problems involving area, volume, and surface area
- Find volumes of spheres, cones, and cylinders and use them to solve problems

Essential Questions

- What is the formula for calculating the circumference of a circle?
- What is the formula for calculating the area of a circle?
- How can you solve multi-step real-life and mathematical problems involving positive rational numbers?
- What steps need to be followed to calculate the area of a composite figure?
- How would you describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids?
- How do you solve problems involving area, volume, and surface area?
- How can you calculate the volume of spheres, cones, and cylinders and use them to solve problems?

Objectives

- Students will be able to derive and apply the formulas for circumference.
- Students will be able to derive and apply the formula for the area of a circle.
- Students will be able to use known formulas to calculate the areas of composite figures.
- Students will be able to identify and describe the two-dimensional figures resulting from horizontal and vertical cross-sections of solids.
- Students will be able to calculate the surface area of a right prism using the surface area formula.

- Students will be able to calculate the volume of a right prism using the volume formula.
- Students will be able to develop and use the formula for the volume of a cylinder.
- Students will be able to develop and use the formulas for the volume of a cone and volume of a sphere.
- Students will be able to solve multi-step problems involving three-dimensional figures using formulas for surface area and volume.

Assessment

Formative Assessment:

- Homework Assignments
- Classwork
- Quizzes
- Skill Worksheets
- Class Discussions

Summative Assessment:

- Module Test
- Unit Test
- Performance Task

Benchmark:

- Link It Benchmark Assessment

Alternative:

- Performance Task
- Modified Tests (independently developed by teacher)
- Projects

Key Vocabulary

- circumference
- pi (π)
- composite figure
- pyramid
- rectangular prism
- surface area
- cross section
- cylinder
- right cone
- sphere

Resources & Materials

- Textbook (Into Math Accelerated Gr. 7)
- All Things Pre-Algebra
- Promethean Board
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- Teacher-Made Materials
- Guided Notes
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- HMH Online (https://www.hmhco.com/ui/#/dashboard)
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Technology Infusion

Teacher Technology:

- Chromebook
- Promethean Board
- Edpuzzle
- Google Apps for Education
- Google Classroom

Student Technology:

- Google Classroom
- Chromebook
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Activities:

- Students will use their Chromebooks to access Google Classroom and Edpuzzle to watch videos about math topics and write out explanations for how practice problems were solved or how the math connects to real-life situations.
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Standard	Standard Description
8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.

Interdisciplinary Integration

Activities:

- Students will practice using the unit vocabulary as they talk and write about the problems they are solving. Understanding the vocabulary will aid their understanding of the concepts covered in this unit.

Resources:

- Quizlet
- Teacher Vision Cross-Curricular Theme Map - https://www.teachervision.com/teaching-methods/curriculum-planning/7167.html
- Engineering Go For It! - http://teachers.egfi-k12.org/
- US Department of Education STEM - http://www.ed.gov/stem
- What Every Educator Should Know About Using Google by Shell Education
- International Literacy Association Read Write Think - http://www.readwritethink.org/

Standard	Standard Description
NJSLS-ELA W.AW.7.1	Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.

21st Century Life Skills Standards	
Activities: ● Students will work in groups to collaborate, at times taking leadership roles, to communicate project ideas to the whole class.	
Standard	**Student Learning Objectives**
9.4.8.TL.6	Collaborate to develop and publish work that provides perspectives on a real-world problem.

Careers	
Activities: ● Students will discuss and then write detailed explanations utilizing appropriate mathematical vocabulary to explain their thought process for obtaining solutions to specific problems	
Practice	**Description**
Use technology to enhance productivity increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
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Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of the problem and carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through this when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. Their own actions or the actions of others.

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

Standards	
Standard #	**Standard Description**
7.EE.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations
7.EE.B.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 $\frac{1}{10}$ of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.G.A	Draw, construct, and describe geometrical figures and describe the relationships between them
7.G.A.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.
7.G.A.2	Draw (with technology, with ruler and protractor, as well as freehand) 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.A.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.
7.G.B	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume
7.G.B.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.B.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.B.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.F.A	Define, evaluate and compare functions

8.F.A.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. (Clarification: Function notation is not required in Grade 8)
8.F.A.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.G.B	Understand and apply the Pythagorean Theorem
8.G.B.6	Explain a proof of the Pythagorean Theorem and its converse.
8.G.B.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.C	Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres
8.G.C.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
8.EE.A	Work with radicals and integer exponents
8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$.
8.EE.A.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9 and determine that the world population is more than 20 times larger.
8.EE.C	Analyze and solve linear equations and pairs of simultaneous linear equations
8.EE.C.7	Solve linear equations in one variable.
8.EE.C.7b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Differentiation
Students with 504 plans
• Preferential seating • Guided notes • Extra time • Teacher check-ins • Use graphic organizers • Redirect attention • Prioritize tasks • Small group testing

- Provide modifications & accommodations per individual student's 504 plan

Special Education

- Provide modifications & accommodations as listed in the student's IEP
- Position the student near a helping peer or have quick access to the teacher
- Modify or reduce assignments/tasks
- Reduce the length of the assignment for different modes of delivery
- Increase one-to-one time
- Prioritize tasks
- Use graphic organizers
- Use online resources for skill-building
- Provide teacher notes
- Use collaborative grouping strategies, such as small groups
- NJDOE resources - http://www.state.nj.us/education/specialed/

Response to Intervention (RTI)

- Tiered interventions following the RTI framework
- Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/
- Intervention Central - http://www.interventioncentral.org/

English Language Learners (ELL)

- Provide text-to-speech
- Use of a translation dictionary or software
- Provide graphic organizers
- NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm
- Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm

Enrichment

- Process should be modified: higher order thinking skills, open-ended thinking, discovery
- Utilize project-based learning for greater depth of knowledge
- Utilize exploratory connections to higher-grade concepts
- Contents should be modified: real-world problems, audiences, deadlines, evaluations, transformations
- Learning environments should be modified: student-centered learning, independence, openness, complexity, and groups should be varied
- NJDOE resources

Califon Public School
Curriculum

Subject:	Grade:	Unit #:	Pacing:
Pre-Algebra	7th	7	3 weeks

Unit Title: Data Analysis and Sampling

OVERVIEW OF UNIT:

This unit focuses on data analysis and sampling. It starts off by looking at scatter plots and how to construct them. Once they have constructed the scatter plots, they will analyze them and draw trend lines to best represent the data. The unit then moves into proportional reasoning with samples to help make inferences from random samples. It continues by using statistics and graphs to compare data. Students will look at the center and spread of data displayed in dot plots and box plots. The unit wraps up by having the students construct and interpret two-way frequency tables and two-way relative frequency tables.

Big Ideas

- Recognize that lines can be used to model the pattern shown in a scatter plot
- Sketch a linear model for a data set displayed in a scatter plot
- Understand the influence of outliers on the trend line of a dataset
- Compare linear models to determine which is the best fit for gthe iven data
- Interpret the rate of change and the initial value of a linear function
- Understand how to select a representative sample
- Understand the ways that a sample could be biased
- Understand that proportional reasoning can be used to make inferences about a population from a random sample
- Use proportional reasoning to make inferences about a population
- Use data from a repeated random sample to draw inferences about a population
- Compare the shapes, centers, and spreads of data displayed in dot plots and box plots
- Draw conclusions about populations based on sample data displayed in dot plots and box plots
- Use measures of center and variability, including mean absolute deviation, for data from random samples to draw informal comparisons about the populations
- Construct and interpret two-way frequency tables
- Determine whether there is an association between events
- Construct and interpret two-way relative frequency tables
- Calculate and interpret conditional relative frequencies

Essential Questions

- How are lines used to model that pattern shown in a scatter plot?
- How do you sketch a linear model for a data set displayed in a scatter plot?
- What is the influence of outliers on the trend line of a dataset?
- How can you determine which linear model is the best fit for given data?

- How do you interpret the rate of change and initial value of a linear function?
- How do you select a representative sample?
- In what ways can a sample be biased?
- How is proportional reasoning used to make inferences about a population from a random sample?
- How is proportional reasoning used to make inferences about a population?
- How is data from a repeated random sample used to draw inferences about a population?
- How are the shapes, centers, and spreads of data displayed in dot plots and box plots similar and different?
- What conclusions can be drawn about populations based on sample data displayed in dot plots and box plots?
- How are informal comparisons about populations drawn from using measures of center and variability, including mean absolute deviation, for data from random samples?
- How do you construct and interpret two-way frequency tables?
- How can you determine whether there is an association between events?
- How do you construct and interpret two-way relative frequency tables?
- How can you calculate and interpret conditional relative frequencies?

Objectives

- Students will be able to display and analyze data with two variables.
- Students will be able to use trend lines to describe a linear relationship between two variables.
- Students will be able to use scatter plots and trends lines to interpret linear data in context.
- Students will be able to understand populations, random samples, and how to select a representative sample.
- Students will be able to use a random sample to make inferences about a population.
- Students will be able to understand that repeatedly sampling a population with the same size random sample will cause the data to vary.
- Students will be able to compare the center and spread of data displayed in dot plots.
- Students will be able to compare data displayed in box plots and use these comparisons to draw inferences about two populations.
- Students will be able to use means and MADs to compare two populations.
- Students will be able to interpret data by constructing two-way frequency tables.
- Students will be able to analyze and interpret two-way relative frequency tables.

Assessment

Formative Assessment:

- Homework Assignments
- Classwork
- Quizzes
- Skill Worksheets
- Class Discussions

Summative Assessment:

- Module Test

Benchmark:

- Link It Benchmark Assessment

Alternative:

- Performance Task
- Modified Tests (independently developed by teacher)
- Projects

- Unit Test
- Performance Task

Key Vocabulary	
• data set	• mean
• outlier	• median
• association	• range
• cluster	• box plot
• linear association	• interquartile range
• negative association	• lower quartile
• no association	• upper quartile
• nonlinear association	• mean absolute deviation
• positive association	• two-way table
• scatter plot	• conditional relative frequency
• trend line	• event
• bias	• frequency
• population	• joint relative frequency
• random sample	• marginal relative frequency
• representative sample	• relative frequency
• sample	• two-way relative frequency table

Resources & Materials

- Textbook (Into Math Accelerated Gr. 7)
- All Things Pre-Algebra
- Promethean Board
- Calculator
- Teacher-Made Materials
- Guided Notes
- Edpuzzle (www.edpuzzle.com)
- Online Games
- IXL (www.ixl.com/math)
- Khan Academy (www.khanacademy.org)
- HMH Online (https://www.hmhco.com/ui/#/dashboard)
- Desmos (www.desmos.com)
- Online Manipulatives (https://illuminations.nctm.org/)

Technology Infusion

Teacher Technology:

- Chromebook
- Promethean Board
- Edpuzzle
- Google Apps for Education
- Google Classroom

Student Technology:

- Google Classroom
- Chromebook
- IXL/Quizzizz/Blooket/Kahoot
- Edpuzzle

Activities:

- Students will use their Chromebooks to access Google Classroom and Edpuzzle to watch videos about math topics and write out explanations for how practice problems were solved or how the math connects to real-life situations.
- Students will use their Chromebooks to access websites like IXL, Khan Academy, Quizzizz, Blooket, Kahoot, etc. to practice and review the skills learned throughout the unit. They will also track their data to demonstrate progress and growth within specified topics.

Standard	Standard Description
8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.

Interdisciplinary Integration

Activities:

- Students will practice using the unit vocabulary as they talk and write about the problems they are solving. Understanding the vocabulary will aid their understanding of the concepts covered in this unit.

Resources:

- Quizlet
- Teacher Vision Cross-Curricular Theme Map - https://www.teachervision.com/teaching-methods/curriculum-planning/7167.html
- Engineering Go For It! - http://teachers.egfi-k12.org/
- US Department of Education STEM - http://www.ed.gov/stem
- What Every Educator Should Know About Using Google by Shell Education
- International Literacy Association Read Write Think - http://www.readwritethink.org/

Standard	Standard Description
NJSLS-ELA W.AW.7.1	Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.

21st Century Life Skills Standards

Activities:

- Students will work in groups to collaborate, at times taking leadership roles, to communicate project ideas to the whole class.

Standard	Student Learning Objectives

9.4.8.TL.6	Collaborate to develop and publish work that provides perspectives on a real-world problem.

Careers	
Activities: ● Students will discuss and then write detailed explanations utilizing appropriate mathematical vocabulary to explain their thought process for obtaining solutions to specific problems	
Practice	**Description**
Use technology to enhance productivity increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
Work productively in teams while using cultural/global competence.	Students positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.
Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of the problem and carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through this when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. Their own actions or the actions of others.

Standards for Mathematical Practice	
MP #	Practice
1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
6	Attend to precision.
7	Look for and make use of structure.

Standards	
Standard #	**Standard Description**
7.RP.A	Analyze proportional relationships and use them to solve real-world and mathematical problems
7.RP.A.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person

	walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $(\frac{1}{2})/(\frac{1}{4})$ miles per hour, equivalently 2 miles per hour.
7.RP.A.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.NS.A	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers
7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers. (Clarification: Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)
7.EE.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations
7.EE.B.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 $\frac{1}{10}$ of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.B.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.EE.B.4a	Solve word problems leading to equations of the form $px + q$ = r and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms with accuracy and efficiency. 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?
7.G.A	Draw, construct, and describe geometrical figures and describe the relationships between them
7.G.A.2	Draw (with technology, with ruler and protractor, as well as freehand) 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.SP.A	Use random sampling to draw inferences about a population

7.SP.A.1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
7.SP.A.2	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. 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.
7.SP.B	Draw informal comparative inferences about two populations
7.SP.B.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.B.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.
8.F.A	Define, evaluate and compare functions
8.F.A.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. (Clarification: Function notation is not required in Grade 8)
8.F.B	Use functions to model relationships between quantities
8.F.B.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.A	Investigate patterns of association in bivariate data
8.SP.A.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.A.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 (e.g. line of best fit) by judging the closeness of the data points to the line.

8.SP.A.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.A.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.EE.B	Understand the connections between proportional relationships, lines, and linear equations
8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
8.EE.C	Analyze and solve linear equations and pairs of simultaneous linear equations
8.EE.C.7	Solve linear equations in one variable.
8.EE.C.7b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
8.EE.C.8	Analyze and solve pairs of simultaneous linear equations.
8.EE.C.8b	Solve systems of two linear equations in two variables using the substitution method and estimate solutions by graphing the equations. Solve simple cases by inspection. For example: by inspection, conclude that $3x+2y=5$ and $3x+2y=6$ have no solution because $3x+2y$ cannot simultaneously be 5 and 6. Solve and using the substitution method; Solve $y=3x+1$ and $y=-2x+7$ using the substitution method.
8.EE.C.8c	Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.

Differentiation
Students with 504 plans
• Preferential seating • Guided notes • Extra time • Teacher check-ins • Use graphic organizers • Redirect attention

- Prioritize tasks
- Small group testing
- Provide modifications & accommodations per individual student's 504 plan

Special Education

- Provide modifications & accommodations as listed in the student's IEP
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English Language Learners (ELL)

- Provide text-to-speech
- Use of a translation dictionary or software
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- Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm

Enrichment

- Process should be modified: higher order thinking skills, open-ended thinking, discovery
- Utilize project-based learning for greater depth of knowledge
- Utilize exploratory connections to higher-grade concepts
- Contents should be modified: real-world problems, audiences, deadlines, evaluations, transformations
- Learning environments should be modified: student-centered learning, independence, openness, complexity, and groups should be varied
- NJDOE resources

Califon Public School
Curriculum

Subject:	Grade:	Unit #:	Pacing:
Pre-Algebra	7th	8	4 weeks

Unit Title: Transform and Construct Geometric Figures

OVERVIEW OF UNIT:

This unit starts off by looking at transformations and congruence. Students learn about translations, rotations, and reflections before taking that knowledge and applying it to recognize congruent figures created by a sequence of transformations. Then the students use their prior knowledge of geometric shapes to deepen their understanding of a variety of geometric shapes by using multiple exploratory techniques. Also, they will develop and come to understand the Triangle Inequality Theorem. The unit finishes by using students' prior knowledge about transformations and teaches them how to make enlarged and reduced similar figures on a coordinate plane. They will compare corresponding sides of a figure and its dilation to find the scale factor. Finally, they will understand that two figures in a plane are similar if one can be transformed into the other using a series of transformations and dilations using drawings and algebraically.

Big Ideas

- Explore and verify the properties of lines and angles in transformations
- Use coordinates to describe the effect of translations, reflections, and rotations
- Execute a sequence of transformations on a figure in the coordinate plane that results in a congruent figure
- Draw and construct circles and other figures with given conditions using technology and freehand
- Analyze how many, if any, triangles or quadrilaterals can be made from given side lengths or angle measures
- Demonstrate the rule that the sum of the three angles of a triangle equals 180 degrees
- Solve problems of length and area using scale drawings
- Learn to describe the effects of dilations
- Dilate images on and off the coordinate plane
- Understand that dilations produce similar figures and the difference between similarity and congruence
- Describe a sequence of transformations that exhibits the similarity between two given figures
- Decide whether the two given figures are similar

Essential Questions

- How can you demonstrate the rule that the sum of the three angles of a triangle equals 180 degrees?
- How are problems of length and area solved using scale drawings?
- How would you describe the effects of dilations?
- How can you dilate images on and off the coordinate plane?
- How do dilations produce similar figures?
- What is the difference between similarity and congruence?

- How does a sequence of transformations exhibit the similarity between two given figures?
- How can you decide whether two given figures are similar?

Objectives
● Students will be able to explore and observe the effects of rigid motions on a figure. ● Students will be able to describe translations and their effects on a figure. ● Students will be able to describe reflections and their effects on a figure. ● Students will be able to recognize and perform rotations. ● Students will be able to describe rotations algebraically. ● Students will be able to identify that rotating a figure produces an image that is congruent to the preimage. ● Students will be able to perform and describe sequences of transformations on figures. ● Students will be able to draw and construct figures using technology and freehand with given conditions. ● Students will be able to determine how many triangles or quadrilaterals can be made given the side lengths: none, one, or many. ● Students will be able to determine how many triangles can be made given the angle measures: none, one, or many. ● Students will be able to draw, construct, and analyze two-dimensional figures to solve real-world problems. ● Students will be able to use scale drawings to solve problems. ● Students will be able to perform enlargements and reductions. ● Students will be able to understand that the result of enlarging or reducing a preimage is not congruent to the preimage. ● Students will be able to describe and apply the properties of dilations. ● Students will be able to find the scale factor and center or dilation, both on and off the coordinate plane. ● Students will be able to recognize and make similar figures using dilations.

Assessment	
Formative Assessment: ● Homework Assignments ● Classwork ● Quizzes ● Skill Worksheets ● Class Discussions **Summative Assessment:** ● Module Test ● Unit Test ● Performance Task	**Benchmark:** ● Link It Benchmark Assessment **Alternative:** ● Performance Task ● Modified Tests (independently developed by teacher) ● Projects

Key Vocabulary

- trapezoid
- transformation
- coordinate plane
- segment
- vertex
- image
- preimage
- translation
- corresponding angles
- parallelogram
- quadrant
- x-axis
- y-axis
- line of reflection
- reflection
- origin
- center of rotation
- rotation
- congruent
- diameter
- radius
- corresponding sides
- proportional relationship
- scale
- scale drawing
- enlargement
- reduction
- center of dilation
- dilation
- scale factor
- similar

Resources & Materials

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- Google Classroom

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Standard	Standard Description
8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.

Interdisciplinary Integration

Activities:

- Students will practice using the unit vocabulary as they talk and write about the problems they are solving. Understanding the vocabulary will aid their understanding of the concepts covered in this unit.

Resources:

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- Teacher Vision Cross-Curricular Theme Map - https://www.teachervision.com/teaching-methods/curriculum-planning/7167.html
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- What Every Educator Should Know About Using Google by Shell Education
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Standard	Standard Description
NJSLS-ELA W.AW.7.1	Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.

21st Century Life Skills Standards

Activities:

- Students will work in groups to collaborate, at times taking leadership roles, to communicate project ideas to the whole class.

Standard	Student Learning Objectives
9.4.8.TL.6	Collaborate to develop and publish work that provides perspectives on a real-world problem.

Careers	
Activities: • Students will discuss and then write detailed explanations utilizing appropriate mathematical vocabulary to explain their thought process for obtaining solutions to specific problems	
Practice	**Description**
Use technology to enhance productivity increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
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Standards for Mathematical Practice	
MP #	Practice
1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
5	Use appropriate tools strategically.
6	Attend to precision.
7	Look for and make use of structure.

Standards	
Standard #	**Standard Description**
7.RP.A	Analyze proportional relationships and use them to solve real-world and mathematical problems
7.RP.A.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $(\frac{1}{2})/(\frac{1}{4})$ miles per hour, equivalently 2 miles per hour.

7.RP.A.2	Recognize and represent proportional relationships between quantities.
7.RP.A.2a	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.
7.RP.A.2b	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
7.RP.A.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.NS.A	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers
7.NS.A.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
7.NS.A.2a	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers. (Clarification: Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)
7.EE.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations
7.EE.B.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 $\frac{1}{10}$ of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.G.A	Draw, construct, and describe geometrical figures and describe the relationships between them
7.G.A.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.
7.G.A.2	Draw (with technology, with ruler and protractor, as well as freehand) 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.B	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume
7.G.B.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.B.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.SP.C	Investigate chance processes and develop, use, & evaluate probability models
7.SP.C.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
7.SP.C.8c	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?
8.G.A	Understand congruence and similarity using physical models, transparencies, or geometry software
8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations:
8.G.A.1a	Lines are transformed to lines, and line segments to line segments of the same length.
8.G.A.1b	Angles are transformed to angles of the same measure.
8.G.A.1c	Parallel lines are transformed to parallel lines.
8.G.A.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.A.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
8.G.A.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.

Differentiation
Students with 504 plans
● Preferential seating ● Guided notes ● Extra time ● Teacher check-ins ● Use graphic organizers ● Redirect attention ● Prioritize tasks

- Small group testing
- Provide modifications & accommodations per individual student's 504 plan

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- Provide text-to-speech
- Use of a translation dictionary or software
- Provide graphic organizers
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Enrichment

- Process should be modified: higher order thinking skills, open-ended thinking, discovery
- Utilize project-based learning for greater depth of knowledge
- Utilize exploratory connections to higher-grade concepts
- Contents should be modified: real-world problems, audiences, deadlines, evaluations, transformations
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Califon Public School
Curriculum

Subject:	Grade:	Unit #:	Pacing:
Pre-Algebra	7th	9	4 weeks

Unit Title: Probability

OVERVIEW OF UNIT:

This unit starts by having students work with experimental probability. They learn about finding the experimental probability of simple and compound events before moving into using experimental probability and proportional reasoning to make predictions. The unit then moves into helping students' understanding of these concepts by having them compare experimental probability to theoretical probability. The students work with the theoretical probability of both simple and compound events before learning about how to conduct simulations.

Big Ideas

- Conduct experiments to infer probabilities and rank outcomes by likelihood
- Represent sample spaces for compound events
- Design and use simulations to generate frequencies for simple and compound events
- Approximate the probability of a chance event by collecting data and predict the approximate relative frequency given the probability
- Approximate the probability of a chance event by collecting data
- Develop a uniform probability model by assigning equal probability to all outcomes
- Understand that the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs
- Design and use a simulation to generate frequencies for compound events
- Solve multi-step problems posed with positive rational numbers

Essential Questions

- How are experiments used to infer probabilities?
- How do you rank outcomes of experiments by likelihood?
- How can you represent sample spaces for compound events?
- How are simulations designed and used to generate frequencies for simple and compound events?
- How do you approximate the probability of a chance event by collecting data?
- How do you approximate relative frequency given the probability?
- How do you approximate the probability of a chance event by collecting data?
- How does assigning an equal probability to all outcomes help develop a uniform probability model?
- How is the probability of a compound event the fraction of outcomes in the sample space for which the compound event occurs?
- How do you design and use a simulation to generate frequencies for compound events?
- How do you solve multi-step problems posed with positive rational numbers?

Objectives
• Students will be able to describe the likelihood of an event in terms of probability between 0 and 1. • Students will be able to find the experimental probability of an event and its complement. • Students will be able to determine the experimental probability of compound events. • Students will be able to use experimental probability and proportional reasoning to make predictions about real-world scenarios. • Students will be able to find the theoretical probability of simple events. • Students will be able to compare theoretical probability to experimental probability. • Students will be able to find and compare theoretical probabilities of compound events using a table, a tree diagram, and an organized list. • Students will be able to use theoretical probability and proportional reasoning to make a qualitative prediction about a simple or compound event. • Students will be able to design and perform a simulation to test the probability of a simple event or a compound event.

Assessment	
Formative Assessment: • Homework Assignments • Classwork • Quizzes • Skill Worksheets • Class Discussions **Summative Assessment:** • Module Test • Unit Test • Performance Task	**Benchmark:** • Link It Benchmark Assessment **Alternative:** • Performance Task • Modified Tests (independently developed by teacher) • Projects

Key Vocabulary	
• event • experiment • outcome • probability • probability of an event • sample space • trial	• complement of an event • experimental probability • simulation • compound event • theoretical probability • tree diagram

Resources & Materials
• Textbook (Into Math Accelerated Gr. 7) • All Things Pre-Algebra • Promethean Board • Calculator • Teacher-Made Materials

- Guided Notes
- Edpuzzle (www.edpuzzle.com)
- Online Games
- IXL (www.ixl.com/math)
- Khan Academy (www.khanacademy.org)
- HMH Online (https://www.hmhco.com/ui/#/dashboard)
- Desmos (www.desmos.com)
- Online Manipulatives (https://illuminations.nctm.org/)

Technology Infusion

Teacher Technology:

- Chromebook
- Promethean Board
- Edpuzzle
- Google Apps for Education
- Google Classroom

Student Technology:

- Google Classroom
- Chromebook
- IXL/Quizzizz/Blooket/Kahoot
- Edpuzzle

Activities:

- Students will use their Chromebooks to access Google Classroom and Edpuzzle to watch videos about math topics and write out explanations for how practice problems were solved or how the math connects to real-life situations.
- Students will use their Chromebooks to access websites like IXL, Khan Academy, Quizzizz, Blooket, Kahoot, etc. to practice and review the skills learned throughout the unit. They will also track their data to demonstrate progress and growth within specified topics.

Standard	Standard Description
8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.

Interdisciplinary Integration

Activities:

- Students will practice using the unit vocabulary as they talk and write about the problems they are solving. Understanding the vocabulary will aid their understanding of the concepts covered in this unit.

Resources:

- Quizlet

- Teacher Vision Cross-Curricular Theme Map - https://www.teachervision.com/teaching-methods/curriculum-planning/7167.html
- Engineering Go For It! - http://teachers.egfi-k12.org/
- US Department of Education STEM - http://www.ed.gov/stem
- What Every Educator Should Know About Using Google by Shell Education
- International Literacy Association Read Write Think - http://www.readwritethink.org/

Standard	Standard Description
NJSLS-ELA W.AW.7.1	Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.

21st Century Life Skills Standards

Activities:

- Students will work in groups to collaborate, at times taking leadership roles, to communicate project ideas to the whole class.

Standard	Student Learning Objectives
9.4.8.TL.6	Collaborate to develop and publish work that provides perspectives on a real-world problem.

Careers

Activities:

- Students will discuss and then write detailed explanations utilizing appropriate mathematical vocabulary to explain their thought process for obtaining solutions to specific problems

Practice	Description
Use technology to enhance productivity increase collaboration and communicate effectively.	Students find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
Work productively in teams while using cultural/global competence.	Students positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.
Utilize critical thinking to make sense of problems and persevere in solving them.	Students readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of the problem and carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through this when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. Their own actions or the actions of others.

Standards for Mathematical Practice	
MP #	Practice
1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
4	Model with mathematics.
5	Use appropriate tools strategically.
7	Look for and make use of structure.

Standards	
Standard #	**Standard Description**
7.EE.B	Solve real-life and mathematical problems using numerical and algebraic expressions and equations
7.EE.B.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 $\frac{1}{10}$ of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.B.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.EE.B.4a	Solve word problems leading to equations of the form $px + q =$ r and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms with accuracy and efficiency. 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?
7.EE.B.4b	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are 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.
7.G.B	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume

7.G.B.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.SP.C	Investigate chance processes and develop, use, & evaluate probability models
7.SP.C5	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 ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
7.SP.C.6	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. 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.C.7	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
7.SP.C.7a	Develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probabilities of events. 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.
7.SP.C.7b	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.C.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
7.SP.C.8a	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.
7.SP.C.8b	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.
7.SP.C.8c	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?
8.F.A	Define, evaluate and compare functions
8.F.A.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. (Clarification: Function notation is not required in Grade 8)

Differentiation
Students with 504 plans
• Preferential seating • Guided notes • Extra time • Teacher check-ins • Use graphic organizers • Redirect attention • Prioritize tasks • Small group testing • Provide modifications & accommodations per individual student's 504 plan
Special Education
• Provide modifications & accommodations as listed in the student's IEP • Position the student near a helping peer or have quick access to the teacher • Modify or reduce assignments/tasks • Reduce the length of the assignment for different modes of delivery • Increase one-to-one time • Use graphic organizers • Use online resources for skill-building • Provide teacher notes • Use collaborative grouping strategies, such as small groups • NJDOE resources - http://www.state.nj.us/education/specialed/
Response to Intervention (RTI)
• Tiered interventions following the RTI framework • Effective RTI strategies for teachers - http://www.specialeducationguide.com/pre-k-12/response-to-intervention/effective-rti-strategies-for-teachers/ • Intervention Central - http://www.interventioncentral.org/
English Language Learners (ELL)
• Provide text-to-speech • Use of a translation dictionary or software • Provide graphic organizers • NJDOE resources - http://www.state.nj.us/education/aps/cccs/ELL.htm • Adapt a Strategy – Adjusting strategies for ESL students - http://www.teachersfirst.com/content/esl/adaptstrat.cfm
Enrichment
• Process should be modified: higher order thinking skills, open-ended thinking, discovery • Utilize project-based learning for greater depth of knowledge • Utilize exploratory connections to higher-grade concepts • Contents should be modified: real-world problems, audiences, deadlines, evaluations, transformations • Learning environments should be modified: student-centered learning, independence, openness, complexity, and groups should be varied