



MIDLAND PARK PUBLIC SCHOOLS
Midland Park, New Jersey
CURRICULUM

Math – Grade 7

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Superintendent of Schools:
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Grade 7 Math Curriculum Overview

The Math 7 course prepares students for the study of algebraic concepts. The course will extend the key concepts developed in grade 6. It will expand the study of the number system to include the real number system, focusing on performing operations with rational numbers. Additional topics include modeling relationships with variables, equations and inequalities, ratio and proportional reasoning, percent applications, the study of angle relationships, triangles, quadrilaterals, circles, area, circumference, surface area, and volume. Students will be introduced to probability and statistics.

Suggested Course Sequence*:

Unit	Name	Number of Days for Students Mastery of Content and Skills
1	The Number System	39 (approx. 8 weeks)
2	Expressions and Equations	34 (approx. 7 weeks)
3	Ratios and Proportional Relationships	30 (approx. 4 - 5 weeks)
4	Geometry	34 (approx. 7 weeks)
5	Statistics and Probability	33 (approx. 4 - 5 weeks)

Prerequisite: 6th grade math

**The number of instructional days is an estimate based on the information available at this time. 1 day equals approximately 48 minutes of seat time. Teachers are strongly encouraged to review the entire unit of study carefully and collaboratively to determine whether adjustments to this estimate need to be made. Pacing is ultimately left up to the individual teacher.*

Content Area: Math 7	
Unit Title: The Number System	
Grade Level: 7	
Unit Summary: Students will apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	
Interdisciplinary Connections: Science, Social Studies, Technology, Broadcasting, Physical Education, Art	
21st Century Themes and Skills: <ul style="list-style-type: none"> • CRP1. Act as a responsible and contributing citizen and employee. • CRP2. Apply appropriate academic and technical skills. • CRP3. Attend to personal health and financial well-being. • CRP4. Communicate clearly and effectively with reason. • CRP5. Consider the environmental, social and economic impacts of decisions. • CRP6. Demonstrate creativity and innovation. • CRP7. Employ valid and reliable research strategies. • CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. • CRP9. Model integrity, ethical leadership, and effective management. • CRP10. Plan education and career paths aligned to personal goals. • CRP11. Use technology to enhance productivity. • CRP12. Work productively in teams while using global competence. 	
Standards (Content):	
CPI #:	Statement:
NJSLS.7.NS.A.	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
NJSLS.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.
NJSLS.7.NS.A.1.a.	Describe situations in which opposite quantities combine to make 0. <i>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?</i>
NJSLS.7.NS.A.1.b.	Understand $p + q$ as the number located a distance $ q $ from p in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
NJSLS.7.NS.A.1.c.	Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
NJSLS.7.NS.A.1.d.	Apply properties of operations as strategies to add and subtract rational numbers.
NJSLS.7.NS.A.2.	Apply and extend previous understandings of multiplication and division of fractions to multiply

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	and divide rational numbers.
NJSLS.7.NS.A.2.a.	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
NJSLS.7.NS.A.2.b.	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.
NJSLS.7.NS.A.2.c.	Apply properties of operations as strategies to multiply and divide rational numbers.
NJSLS.7.NS.A.2.d.	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.
NJSLS.7.NS.A.3.	Solve real-world and mathematical problems involving the four operations with rational numbers.

Standards (Technology):

CPI #:	Statement:
8.1.8.A.1.	Demonstrate knowledge of a real world problem using digital tools.
8.1.8.A.3.	Use and/ or develop a simulation that provides an environment to solve a real world problem or theory.

Unit Essential Questions:

- How do numbers relate or compare to one another?
- Why do we use estimation and when it is appropriate?
- Why do we use numbers and what are their properties?
- How does the number system function?
- How can adding, subtracting, multiplying, and dividing integers, fractions, and decimals help me in my career or life?
- How can counting, measuring, or labeling help to make sense of the world around us?
- What makes a computational strategy both effective and efficient?
- How can we represent the same number in different ways?
- Why is it useful for us to be able to represent the same number differently?
- How do operations affect numbers?
- How are rational numbers used in the real world?

Unit Enduring Understandings:

- Subsets of numbers, including: natural, whole, integer, rational, irrational, and real
- Naming a set using either a description, roster, or number line
- Comparing and ordering rational numbers
- Finding the distance between two rational numbers
- Properties of numbers (commutative, associative, identity, and distributive)
- Opposites and absolute value
- Operations with integers, fractions, and decimals
- Converting between fractions and decimals
- Real-world problems involving the number system

Unit Learning Targets/ Objectives:

Students will...

- Understand that there are an infinite amount of numbers between 0 and 1.
- Understand that numbers fall into one or more of the following subsets: natural, whole, integer, rational, irrational, and real numbers.
- Estimate square roots.
- Name a set using description, roster, or a number line.
- Order and compare integers.
- Use properties of numbers to simplify evaluate numerical and algebraic expressions.
- Understand opposites and absolute value.
- Find the distance between two rational numbers.
- Add, subtract, multiply, and divide integers, fractions, and decimals.
- Determine when the decimal form of a rational number terminates or repeats.
- Convert between fractions and decimals.
- Simplify expressions using the order of operations.
- Solve real-world problems involving ordering integers, opposites, absolute value, and operations with rational numbers.

Formative Assessments: Do Nows, Exit Tickets, Checks for Understanding, Graded Assignments

Summative/ Benchmark Assessments: Quizzes throughout the Unit, Unit Test

Resources/ Materials:

- IXL.com
- Kuta Software
- Commoncoresheets.com
- Various math internet resources

Modifications:

Special Education Students:

- Allow errors.
- Rephrase questions, directions, and explanations.
- Allow extended time to answer questions.
- Permit drawing as an explanation (when possible).
- Accept participation at any level.
- Consult with case managers.
- Follow IEP modifications and accommodations.

English Language Learners:

- Assign a buddy.
- Allow errors in speaking and writing.
- Rephrase questions, directions, and explanations.
- Allow extended time to answer questions.
- Accept participation at any level.

At-Risk Students:

- Provide extended time to complete tasks.
- Consult with guidance counselors and follow I&RS procedures and action plans.
- Work to provide specific behavior interventions.
- Provide rewards as necessary.

Gifted and Talented Students:

- Provide extension activities.
- Build on students' intrinsic motivations.
- Consult with parents to accommodate students' interests in completing tasks at their level of engagement.

Lesson Number:	Lesson Objective(s):	Time Frame (day(s) to complete):
1	Introduction of the number line (specifically rational numbers between 0 and 1)	1
2	Subsets of numbers (natural, whole, integer, rational, irrational, real); nested boxes, hierarchy <ul style="list-style-type: none"> Estimate square roots (irrational numbers) 	1
3	Name a set (description, roster, number line); subsets with number lines	2
4	Order and compare rational numbers (including integers, fractions, and decimals)	1
5	Properties of numbers (commutative, associative, identity, distributive)	2
6	(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. <ul style="list-style-type: none"> Add and subtract on a horizontal or vertical number line Double negatives 	2
7	(7.NS.A.1.a.) Describe situations in which opposite quantities combine to make 0. <i>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?</i> <ul style="list-style-type: none"> Opposites 	1
8	(7.NS.A.1.b.) Understand $p + q$ as the number located a distance $ q $ from p in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. <ul style="list-style-type: none"> Add integers Opposites Absolute value Distance between two numbers 	2
9	(7.NS.A.1.c.) Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. <ul style="list-style-type: none"> Subtract integers Opposites Absolute value Distance between two numbers Add and subtract rational numbers (integers, decimals, fractions) 	3
10	(7.NS.A.1.d.) Apply properties of operations as strategies to add and subtract rational numbers. <ul style="list-style-type: none"> Add and subtract rational numbers (integers, decimals, fractions) 	3

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11	(7.NS.A.2.) Apply and extend previous understandings of multiplication and division of fractions to multiply and divide rational numbers.	2
12	(7.NS.A.2.a.) Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. <ul style="list-style-type: none"> • Multiply rational numbers (integers, decimals, and fractions) • Distributive property 	1
13	(7.NS.A.2.b.) Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts. <ul style="list-style-type: none"> • Divide rational numbers (integers, decimals, and fractions) • Dividing by 0. 	1
14	(7.NS.A.2.c.) Apply properties of operations as strategies to multiply and divide rational numbers. <ul style="list-style-type: none"> • Multiply and divide rational numbers (integers, decimals, and fractions) • Dividing by 0 	2
15	(7.NS.A.2.d.) 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. <ul style="list-style-type: none"> • Fractions to decimals • Decimals to fractions • Terminating and repeating decimals • Order fractions and decimals 	2
16	(7.NS.A.3.) Solve real-world and mathematical problems involving the four operations with rational numbers. <ul style="list-style-type: none"> • Order of operations with integers, decimals, and fractions • Distributive property • Word problems involving rational numbers 	4

Teacher Notes:

- 39 days are allotted for this unit including 6 assessment days and 1 review day (this includes 2 buffer days)

Content Area: Math 7

Unit Title: Expressions and Equations

Grade Level: 7

Unit Summary: Students will use properties of operations to generate equivalent expressions. Students will solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Interdisciplinary Connections: English, Science, Social Studies, Technology, Broadcasting, Physical Education, Art

21st Century Themes and Skills:

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP3. Attend to personal health and financial well-being.
- CRP4. Communicate clearly and effectively with reason.
- CRP5. Consider the environmental, social and economic impacts of decisions.
- CRP6. Demonstrate creativity and innovation.
- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership, and effective management.
- CRP10. Plan education and career paths aligned to personal goals.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using global competence.

Standards (Content):

CPI #:	Statement:
NJSLS.7.EE.A.	Use properties of operations to generate equivalent expressions.
NJSLS.7.EE.A.1.	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
NJSLS.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. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i>
NJSLS.7.EE.B.	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
NJSLS.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. <i>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 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.</i>

NJSLS.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.
NJSLS.7.EE.B.4.a.	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$ where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. <i>For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i>
NJSLS.7.EE.B.4.b.	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. <i>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.</i>

Standards (Technology):

CPI #:	Statement:
8.1.8.A.1.	Demonstrate knowledge of a real world problem using digital tools.
8.1.8.A.4.	Graph and calculate data within a spreadsheet and present a summary of the results.

Unit Essential Questions:

- What is algebra?
- How can I generate an equivalent expression? How can I tell if two expressions are equivalent?
- How do algebraic representations relate and compare to one another?
- How do you translate real-world problems to algebraic expressions and equations?
- What properties do I need to understand and be able to apply in order to simplify and evaluate algebraic expressions and equations?
- What do inequalities represent?
- How are expressions, equations, and inequalities different? How are they alike?

Unit Enduring Understandings:

- Combining like terms in expressions, equations, and inequalities
- Factoring expressions
- Simplifying expressions
- Equivalent expressions
- Expressions, equations, and inequalities
- Solving equations and inequalities
- Solving real-world problems involving expressions, equations, and inequalities

Unit Learning Targets/ Objectives:*Students will...*

- Add, subtract, factor, and expand linear expressions with rational coefficients.
- Recognize and create equivalent expressions.
- Evaluate expressions given a specific value.
- Write expressions in different forms given a real-world context.
- Solve one- and two-step equations and inequalities.
- Check solutions of equations and inequalities into the original equation or inequality.
- Solve word problems involving expressions, equations or inequalities.

Formative Assessments: Do Nows, Exit Tickets, Checks for Understanding, Graded Assignments

Summative/ Benchmark Assessments: Quizzes throughout the Unit, Unit Test**Resources/ Materials:**

- IXL.com
- Kuta Software
- Commoncoresheets.com
- Various math internet resources

Modifications:*Special Education Students:*

- Allow errors.
- Rephrase questions, directions, and explanations.
- Allow extended time to answer questions.
- Permit drawing as an explanation (when possible).
- Accept participation at any level.
- Consult with case managers.
- Follow IEP modifications and accommodations.

English Language Learners:

- Assign a buddy.
- Allow errors in speaking and writing.
- Rephrase questions, directions, and explanations.
- Allow extended time to answer questions.
- Accept participation at any level.

At-Risk Students:

- Provide extended time to complete tasks.
- Consult with guidance counselors and follow I&RS procedures and action plans.
- Work to provide specific behavior interventions.
- Provide rewards as necessary.

Gifted and Talented Students:

- Provide extension activities.
- Build on students' intrinsic motivations.
- Consult with parents to accommodate students' interests in completing tasks at their level of engagement.

Lesson Number:	Lesson Objective(s):	Time Frame (day(s) to complete):
15	(7.EE.A.1.) Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. <ul style="list-style-type: none"> • Expressions vs. equations • Distributive property • Combine like terms • Equivalent expressions with integers, fractions, and decimals (including those with variables) • Evaluate expressions given a value • Check if a given value is a solution to an equation • Factor by GCF 	8
16	(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	2

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	<p>are related. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i></p> <ul style="list-style-type: none"> • Words into math • Understand the meaning of a given expression • Equivalent expressions 	
17	<p>(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. <i>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 place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is 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.</i></p> <ul style="list-style-type: none"> • Equivalent expressions • Meaning of numerical expressions • Expression and equation word problems 	3
18	<p>(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.</p> <ul style="list-style-type: none"> • Equation word problems • Inequality word problems 	1
19	<p>(7.EE.B.4.a.) Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$ where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. <i>For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</i></p> <ul style="list-style-type: none"> • One- and two-step equations • Solve and check equations • Equation word problems • Check if a given value is a solution to an equation 	6
20	<p>(7.EE.B.4.b.) Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. <i>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.</i></p> <ul style="list-style-type: none"> • One- and two-step inequalities • Solve and check inequalities • Graph solutions on a number line • Inequality word problems • Check if a given value is a solution to an inequality 	6

Teacher Notes:

- 34 days are allotted for this unit including 5 assessment days and 1 review day (this includes 2 buffer days)

Content Area: Math 7

Unit Title: Ratios and Proportional Relationships

Grade Level: 7

Unit Summary: Students will analyze proportional relationships and use them to solve real-world and mathematical problems.

Interdisciplinary Connections: English, Science, Social Studies, Technology, Physical Education, Art

21st Century Themes and Skills:

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP3. Attend to personal health and financial well-being.
- CRP4. Communicate clearly and effectively with reason.
- CRP5. Consider the environmental, social and economic impacts of decisions.
- CRP6. Demonstrate creativity and innovation.
- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership, and effective management.
- CRP10. Plan education and career paths aligned to personal goals.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using global competence.

Standards (Content):

CPI #:	Statement:
NJSLS.7.RP.A.	Analyze proportional relationships and use them to solve real-world and mathematical problems.
NJSLS.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. <i>For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as a complex fraction $(\frac{1}{2})/(\frac{1}{4})$ miles per hour, equivalently 2 miles per hour.</i>
NJSLS.7.RP.A.2.	Recognize and represent proportional relationships between quantities.
NJSLS.7.RP.A.2.a.	Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
NJSLS.7.RP.A.2.b.	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
NJSLS.7.RP.A.2.c.	Represent proportional relationships by equations. <i>For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as $t = pn$.</i>
NJSLS.7.RP.A.2.d.	Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$, where r is the unit rate.

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NJSLS.7.RP.A.3.	Use proportional relationships to solve multistep ratio and percent problems. <i>Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</i>
Standards (Technology):	
CPI #:	Statement:
8.1.8.A.1.	Demonstrate knowledge of real world problems using digital tools.
8.1.8.A.2.	Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.
8.1.8.A.5.	Create a database query, sort and create a report and describe the process, and explain the report results.
Unit Essential Questions: <ul style="list-style-type: none"> • When do I use proportional comparisons? • How are proportions useful in comparing different, but similar, quantities? • How can a unit rate make you a smart and thrifty consumer? • How can ratios and proportions help a business determine which products are selling the best? • How can I use proportions to compute simple interest, tax, markups and markdowns, gratuities and commissions, and fees? • What does percent error tell us? 	
Unit Enduring Understandings: <ul style="list-style-type: none"> • Computing unit rates, and using them to calculate better buys • Comparing rates in rational number quantities • Recognizing and representing proportional relationships between quantities • Writing and solving proportions • Identifying the constant of proportionality • Using the constant of proportionality to write equations for real-world applications • Solving percent problems using proportions 	
Unit Learning Targets/ Objectives: <i>Students will...</i> <ul style="list-style-type: none"> • Compute unit rates (including those associated with ratios of fractions) and use them to compare quantities and determine better buys. • Determine if two ratios are proportional. • Represent proportional relationships between two quantities. • Identify the constant of proportionality from tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. • Write equations for proportional relationships. • Explain the meaning of a point (x, y) on a graph, paying special attention to the point (1, r), where r is the unit rate. • Calculate simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, and percent error. 	
Formative Assessments: Do Nows, Exit Tickets, Checks for Understanding, Graded Assignments	
Summative/ Benchmark Assessments: Quizzes throughout the Unit, Unit Test	
Resources/ Materials: <ul style="list-style-type: none"> • IXL.com 	

- Kuta Software
- Commoncoresheets.com
- Various math internet resources

Modifications:*Special Education Students:*

- Allow errors.
- Rephrase questions, directions, and explanations.
- Allow extended time to answer questions.
- Permit drawing as an explanation (when possible).
- Accept participation at any level.
- Consult with case managers.
- Follow IEP modifications and accommodations.

English Language Learners:

- Assign a buddy.
- Allow errors in speaking and writing.
- Rephrase questions, directions, and explanations.
- Allow extended time to answer questions.
- Accept participation at any level.

At-Risk Students:

- Provide extended time to complete tasks.
- Consult with guidance counselors and follow I&RS procedures and action plans.
- Work to provide specific behavior interventions.
- Provide rewards as necessary.

Gifted and Talented Students:

- Provide extension activities.
- Build on students' intrinsic motivations.
- Consult with parents to accommodate students' interests in completing tasks at their level of engagement.

Lesson Number:	Lesson Objective(s):	Time Frame (day(s) to complete):
21	(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 a complex fraction $(\frac{1}{2})/(\frac{1}{4})$ miles per hour, equivalently 2 miles per hour. <ul style="list-style-type: none"> • Unit rates, including those with complex fractions • Better buys 	2
22	(7.RP.A.2.) Recognize and represent proportional relationships between quantities. <ul style="list-style-type: none"> • Check if two ratios are proportional • Solve proportions • Find the percent of a number 	6
23	(7.RP.A.2.a.) Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through	3

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	the origin.	
24	(7.RP.A.2.b.) Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	2
25	(7.RP.A.2.c.) Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p , the relationship between the total cost and the number of items can be expressed as $t = pn$.	2
26	(7.RP.A.2.d.) Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$, where r is the unit rate. <ul style="list-style-type: none"> • Unit rate • Direct variation 	2
27	(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.	5
Teacher Notes: <ul style="list-style-type: none"> • 30 days are allotted for this unit including 5 assessment days and 1 review day (this includes 2 buffer days) 		

Content Area: Math 7

Unit Title: Geometry

Grade Level: 7

Unit Summary: Students will draw, construct, and describe geometrical figures and describe the relationship between them. Students will solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Interdisciplinary Connections: Science, Social Studies, Technology, Broadcasting, Physical Education, Art

21st Century Themes and Skills:

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP3. Attend to personal health and financial well-being.
- CRP4. Communicate clearly and effectively with reason.
- CRP5. Consider the environmental, social and economic impacts of decisions.
- CRP6. Demonstrate creativity and innovation.
- CRP7. Employ valid and reliable research strategies.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership and effective management.
- CRP10. Plan education and career paths aligned to personal goals.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using global competence.

Standards (Content):

CPI #:	Statement:
NJSLS.G.A.	Draw, construct, and describe geometrical figures and describe the relationships between them.
NJSLS.G.A.1.	Solve problems involving scale drawings of geometrical figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
NJSLS.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.
NJSLS.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.
NJSLS.G.B.	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
NJSLS.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.
NJSLS.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.

NJSLS.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.
Standards (Technology):	
CPI #:	Statement:
8.1.8.A.1.	Demonstrate knowledge of a real world problem using digital tools.
8.1.8.A.4.	Graph and calculate data within a spreadsheet and present a summary of the results.
Unit Essential Questions: <ul style="list-style-type: none"> • When and how are scale drawings used in the real world? • How can geometric shapes with given conditions be constructed by hand, with tools, or with technology? • How can measurements and information about similar figures be used to solve problems? • How can three-dimensional objects be deconstructed or cross-sectioned to form two-dimensional figures? • How are the circumference and area of a circle calculated? How are they related? • What relationships exist between angles? • What does area, volume, and surface area represent? • How are area, volume and surface area of two- and three-dimensional objects calculated? 	
Unit Enduring Understandings: <ul style="list-style-type: none"> • Solving problems involving scale drawings • Drawing geometric shapes with given conditions • Cross sections of prisms and pyramids • Finding circumference and area of a circle • Finding angle measures using the relationships between the angles • Calculating area, volume, and surface area of figures composed of triangles, quadrilaterals, polygons, cubes, and right prisms 	
Unit Learning Targets/ Objectives: <i>Students will...</i> <ul style="list-style-type: none"> • Solve problems involving scale drawings of geometric figures. • Draw geometric shapes with given conditions. • Describe the two-dimensional figures that result from slicing three-dimensional figures. • Find the circumference and area of a circle. • Describe the relationship (give an informal derivation) between the circumference and area of a circle. • Find missing angle measures using angle relationships. • Solve problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. 	
Formative Assessments: Do Nows, Exit Tickets, Checks for Understanding, Graded Assignments	
Summative/ Benchmark Assessments: Quizzes throughout the Unit, Unit Test	
Resources/ Materials: <ul style="list-style-type: none"> • IXL.com • Kuta Software • Commoncoresheets.com • Various math internet resources 	
Modifications: <i>Special Education Students:</i>	

- Allow errors.
- Rephrase questions, directions, and explanations.
- Allow extended time to answer questions.
- Permit drawing as an explanation (when possible).
- Accept participation at any level.
- Consult with case managers.
- Follow IEP modifications and accommodations.

English Language Learners:

- Assign a buddy.
- Allow errors in speaking and writing.
- Rephrase questions, directions, and explanations.
- Allow extended time to answer questions.
- Accept participation at any level.

At-Risk Students:

- Provide extended time to complete tasks.
- Consult with guidance counselors and follow I&RS procedures and action plans.
- Work to provide specific behavior interventions.
- Provide rewards as necessary.

Gifted and Talented Students:

- Provide extension activities.
- Build on students' intrinsic motivations.
- Consult with parents to accommodate students' interests in completing tasks at their level of engagement.

Lesson Number:	Lesson Objective(s):	Time Frame (day(s) to complete):
28	(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. <ul style="list-style-type: none"> • Scale drawings 	4
29	(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. <ul style="list-style-type: none"> • Draw a figure given specific conditions 	3
30	(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. <ul style="list-style-type: none"> • Cross sections 	2
31	(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. <ul style="list-style-type: none"> • Circumference of a circle • Area of a circle 	2

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32	(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. <ul style="list-style-type: none"> • Angle relationships 	4
33	(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. <ul style="list-style-type: none"> • Area of two-dimensional figures (including composite figures) • Volume and surface area of two- and three-dimensional objects (including composite objects) 	10

Teacher Notes:

- 34 days are allotted for this unit including 6 assessment days and 1 review day (this includes 2 buffer days)

Content Area: Math 7	
Unit Title: Statistics and Probability	
Grade Level: 7	
Unit Summary: Students will use random sampling to draw inferences about a population. Students will draw informal comparative inferences about two populations. Students will investigate chance processes and develop, use, and evaluate probability models.	
Interdisciplinary Connections: English, Science, Social Studies, Technology, Broadcasting, Physical Education, Art	
21st Century Themes and Skills: <ul style="list-style-type: none"> • CRP1. Act as a responsible and contributing citizen and employee. • CRP2. Apply appropriate academic and technical skills. • CRP3. Attend to personal health and financial well-being. • CRP4. Communicate clearly and effectively with reason. • CRP5. Consider the environmental, social and economic impacts of decisions. • CRP6. Demonstrate creativity and innovation. • CRP7. Employ valid and reliable research strategies. • CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. • CRP9. Model integrity, ethical leadership and effective management. • CRP10. Plan education and career paths aligned to personal goals. • CRP11. Use technology to enhance productivity. • CRP12. Work productively in teams while using global competence. 	
Standards (Content):	
CPI #:	Statement:
NJSLS.7.SP.A.	Use random sampling to draw inferences about a population.
NJSLS.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.
NJSLS.7.SP.A.2.	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. <i>For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</i>
NJSLS.7.SP.B.	Draw informal comparative inferences about two populations.
NJSLS.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. <i>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</i>

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	<i>distributions of heights is noticeable.</i>
NJSLS.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. <i>For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.</i>
NJSLS.7.SP.C.	Investigate chance processes and develop, use, and evaluate probability models.
NJSLS.7.SP.C.5.	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
NJSLS.7.SP.C.6.	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. <i>For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.</i>
NJSLS.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.
NJSLS.7.SP.C.7.a.	Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. <i>For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</i>
NJSLS.7.SP.C.7.b.	Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. <i>For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</i>
NJSLS.7.SP.C.8.	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
NJSLS.7.SP.C.8.a.	Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
NJSLS.7.SP.C.8.b.	Represent the 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.
NJSLS.7.SP.C.8.c.	Design and use a simulation to generate frequencies for compound events. <i>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?</i>
Standards (Technology):	
CPI #:	Statement:
8.1.8.A.1.	Demonstrate knowledge of a real world problem using digital tools.
8.1.8.A.3.	Use and/or develop a simulation that provides an environment to solve a real world problem or theory.

Unit Essential Questions:

- How can we gather, organize, and display data to communicate and justify results in the real world?
- How can we analyze data to make inferences and/or predictions, based on surveys, experiments, probability, and observational studies?
- How can a survey be used to make conclusions about a general population?
- How can the collection, organization, interpretation, and display of data be used to solve problems?
- What strategies can be used to compare two different data sets?
- How can measures of central tendency be used to help understand and describe data distribution?
- How can we calculate the simple probability of an event occurring?
- How can we calculate the probability of two or more events occurring?
- How can we use simulations to calculate probabilities?

Unit Enduring Understandings:

- Determining biased vs. unbiased samples
- Making predictions about populations from a sample of the same population
- Creating simulations used for probability
- Using measures of center to compare variabilities of two samples
- Drawing informal comparative inferences about two populations
- Determining the probability of a simple or compound event
- Creating and using sample spaces

Unit Learning Targets/ Objectives:

Students will...

- Compare biased vs. unbiased samples.
- Make predictions about a population using a small sample of the same population.
- Create simulations to represent a population.
- Compare samples using different measures of center.
- Calculate mean absolute deviation and explain its meaning.
- Calculate simple probabilities of events.
- Develop uniform and non-uniform probability models.
- Represent sample spaces and calculate the number of elements in a sample space.

Formative Assessments: Do Nows, Exit Tickets, Checks for Understanding, Graded Assignments

Summative/ Benchmark Assessments: Quizzes throughout the Unit, Unit Test

Resources/ Materials:

- IXL.com
- Kuta Software
- Commoncoresheets.com
- Various math internet resources

Modifications:

Special Education Students:

- Allow errors.
- Rephrase questions, directions, and explanations.
- Allow extended time to answer questions.
- Permit drawing as an explanation (when possible).
- Accept participation at any level.
- Consult with case managers.
- Follow IEP modifications and accommodations.

English Language Learners:

- Assign a buddy.

- Allow errors in speaking and writing.
- Rephrase questions, directions, and explanations.
- Allow extended time to answer questions.
- Accept participation at any level.

At-Risk Students:

- Provide extended time to complete tasks.
- Consult with guidance counselors and follow I&RS procedures and action plans.
- Work to provide specific behavior interventions.
- Provide rewards as necessary.

Gifted and Talented Students:

- Provide extension activities.
- Build on students' intrinsic motivations.
- Consult with parents to accommodate students' interests in completing tasks at their level of engagement.

Lesson Number:	Lesson Objective(s):	Time Frame (day(s) to complete):
34	(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. <ul style="list-style-type: none"> • Biased vs. unbiased samples • Make predictions using proportions • Use a sample of a population to represent the entire population 	2
35	(7.SP.A.2.) Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. <i>For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</i> <ul style="list-style-type: none"> • Make predictions using proportions • Create simulations 	2
36	(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. <i>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.</i> <ul style="list-style-type: none"> • Compare samples • Measures of center • Mean absolute deviation 	2
37	(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. <i>For example, decide whether the words</i>	2

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	<p><i>in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.</i></p> <ul style="list-style-type: none"> • Measures of center • Measures of variability • Compare two populations 	
38	<p>(7.SP.C.5.) Understand 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 $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.</p> <ul style="list-style-type: none"> • Look at the "likeliness" of an event occurring • Probability of simple events 	2
39	<p>(7.SP.C.6.) Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. <i>For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.</i></p> <ul style="list-style-type: none"> • Approximate the probability of an event occurring 	2
40	<p>(7.SP.C.7.) Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observe frequencies; if the agreement is not good, explain possible sources of the discrepancy.</p>	2
41	<p>(7.SP.C.7.a.) Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. <i>For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</i></p>	2
42	<p>(7.SP.C.7.b.) Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. <i>For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</i></p>	2
43	<p>(7.SP.C.8.) Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</p> <ul style="list-style-type: none"> • Compound probability 	1
44	<p>(7.SP.C.8.a.) Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.</p> <ul style="list-style-type: none"> • Probability of simple events • Probability of compound events 	2
45	<p>(7.SP.C.8.b.) Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.</p> <ul style="list-style-type: none"> • Compound probabilities 	2
46	<p>(7.SP.C.8.c.) Design and use a simulation to generate frequencies for</p>	2

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	<p>compound events. <i>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?</i></p> <ul style="list-style-type: none">• Find probabilities through simulations	
<p>Teacher Notes:</p> <ul style="list-style-type: none">• 33 days are allotted for this unit including 5 assessment days and 1 review day (this includes 2 buffer days)		