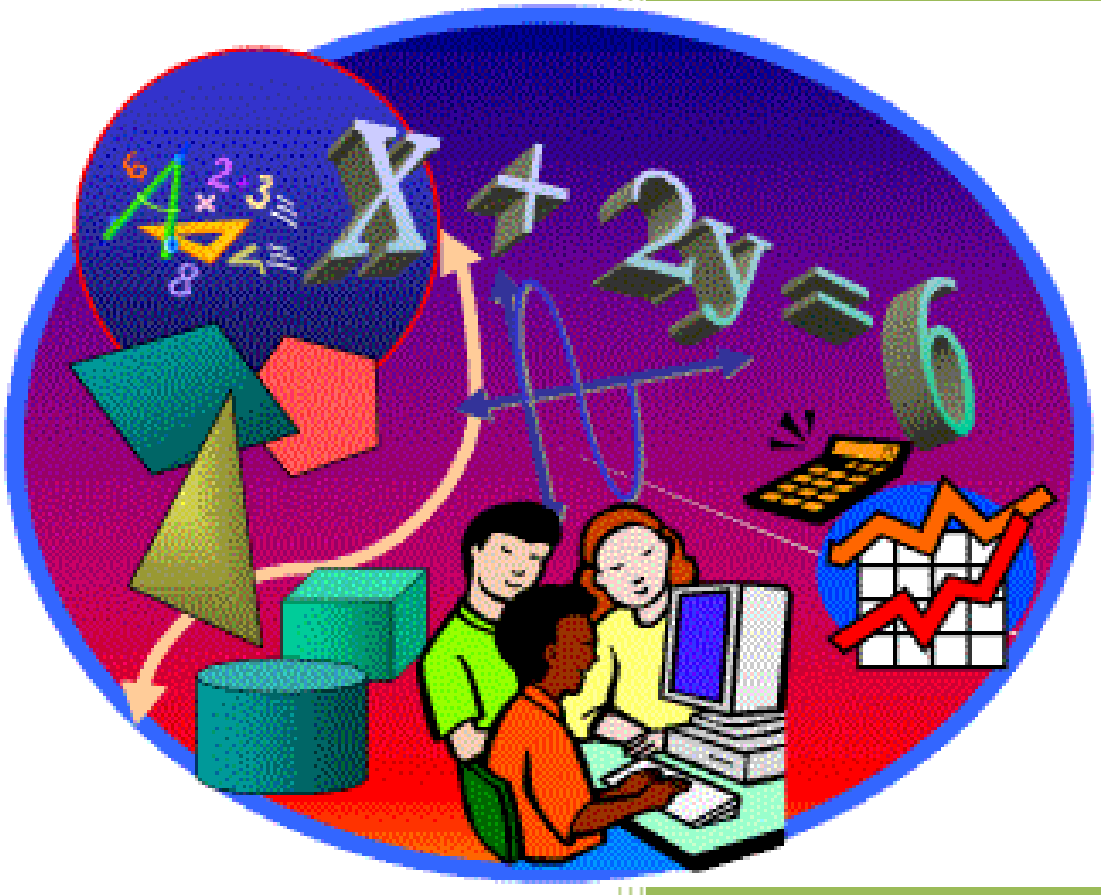
2017

Middle School Algebra 7 Curriculum Guide



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Eastampton Community School

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TABLE OF CONTENT

While in 6th grade, the students will cover the contents of unit one (Algebra and Integers) from the Glencoe McGraw-Hill series. This unit correlates to unit two (The Number System) of the Common Core Standards. In 7th grade the students will continue their studies with Ratios and Proportional Relationships.

Ratios and Proportional Relationships	**Strand:** Analyze proportional relationships and use them to solve real-world and mathematical problems.

New Jersey Student Learning Standards:

CCSS.Math.Content.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 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction $^{1/2}/_{1/4}$ miles per hour, equivalently 2 miles per hour*.

CCSS.Math.Content.7.RP.A.2 Recognize and represent proportional relationships between quantities.

- CCSS.Math.Content.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.
- CCSS.Math.Content.7.RP.A.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- CCSS.Math.Content.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*.
- CCSS.Math.Content.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.

CCSS.Math.Content.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.

Big Ideas:

Developing understanding of and applying proportional reasoning:

1. Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems.
2. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease.
3. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects.
4. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.

Essential Questions:	**Enduring Understandings:**
1. How can we use mathematics to describe change and model real-world situations? 2. How can you show that two objects are proportional? 3. How is a rate a measure of one quantity per unit of another quantity? 4. What is a complex fraction? 5. How are pounds per gallon and kilograms per liter alike? How are they different? 6. What makes two quantities proportional? 7. How does graphing relationships help you determine whether the relationship is proportional or not? 8. How do you solve a proportion? 9. How can you find the unit rate from a line on a graph? 10. How is rate of change related to slope? 11. How can you determine if a linear function is a direct variation from an equation? a table? a graph?	1. Numeric fluency includes both the understanding of and the ability to appropriately use numbers. 2. Computational fluency includes understanding the meaning and the appropriate use of numerical operations. 3. A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways to solve that problem. 4. Context is critical when using estimation.

Knowledge, Skills, and Instructional Objectives:

1. Use the language of ratios to make comparisons of 2 quantities.
2. Become comfortable with ratio and related forms of comparisons (rates, unit rates, unit dimensional analysis, etc) to solve problems.
3. Introduce and formalize the meaning of unit rates and computation strategies (means to extremes, cross-products, etc) for computing unit rates.
4. Relate unit rate to slope of the line representing the equation of the underlying relationship.
5. Understand what it means to divide in a rate situation.
6. Apply proportional reasoning to solve for the unknown part when one part of two equal ratios is unknown.
7. Set up and solve proportions that arise in applications (percent proportions, similar figures, tax, discounts, etc).
8. Choose strategies for solving problems requiring proportional reasoning.

Instructional Materials/Resources:

Mathematics Course 2	Glencoe/McGraw-Hill	NJ Edition
Mathematics Course 3	Glencoe/McGraw-Hill	NJ Edition
Mathematics Connects Course 2	Glencoe/McGraw-Hill	NJ Edition
Pre-Algebra	Glencoe/McGraw-Hill	NJ Edition
Algebra 1	Glencoe/McGraw-Hill	
NJ Ask 7	Prentice Hall	Brief Review
Commom Core Coach Mathematics 7	Triumph Learning	NJ 1st Edition

Suggested Vocabulary

Complex Fractions	Dimension Analysis	Rate of Change
Constant of Proportionality	Direct Variation	Slope
Constant Rate of Change	Equivalent Ratios	Unit Rate
Constant Variation	Proportion	Unit Ratio

Technology:

ActivBoard (Promethean Planet)
Document Camera
Internet Sites (figurethis.org, mathcats.com, etc)
I-Pads (Math Ref, Motion Math, Quick Graph, Pi-Cubed, etc)
(Graphing) Calculators
WebQuests
8.1.2.A.4; 8.1.P.C.1

Recommended Instructional Activities:

Warm-ups (Do Nows)
Problem of the Day (Computational Short Constructed Response)
Problem of the Week (Written Extended Response)
Guided Practice (Classwork)
Independent Practice (Classwork)
Cooperative Group Activities
Homework Assignments
Reflection Journals

Extension Strategies/Activities:

21st Century Career Connections (Bio-Mechanical Engineering)
Real-World Application
Mathematics Station Activities: Ratios and Proportional Relationships Sets 1 – 5 (Common Core Walch Education)

Cross-curricular Connections/Standards:

RI.7.4.; NJSLSA.W2; W.7.2.; NJSLSA.SL1; SL.7.1

21st Century Skills
CRP1; CRP3; CRP6; CRP11; CRP12

Suggested Assessments:

Homework/Classwork	Performance-Based Assessments (with multi-step, problem-solving tasks)
Projects	Developmental and Summative Assessments

The Number System	**Strand:** Apply and extend previous understandings of operations with fractions.

New Jersey Student Learning Standards:

CCSS.Math.Content.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.

- CCSS.Math.Content.7.NS.A.1a Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged*.

- CCSS.Math.Content.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.

- CCSS.Math.Content.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.

- CCSS.Math.Content.7.NS.A.1d Apply properties of operations as strategies to add and subtract rational numbers.

CCSS.Math.Content.7.NS.A.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

- CCSS.Math.Content.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.

- CCSS.Math.Content.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 p and q are integers, then $–(p/q) = (–p)/q = p/(–q)$. Interpret quotients of rational numbers by describing real-world contexts.

- CCSS.Math.Content.7.NS.A.2c Apply properties of operations as strategies to multiply and divide rational numbers.

- CCSS.Math.Content.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.

CCSS.Math.Content.7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.[1]

[1] Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

Big Ideas:
Developing understanding of operations with rational numbers:

1. Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers.
2. Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division.
3. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers.

Essential Questions:

1. How can we compare and contrast number?
2. What happens when you add, subtract, multiply and divide integers?
3. Why is the absolute value of any number positive?
4. When adding integers, how can you tell whether the sum will be positive, negative or zero without really adding?
5. How is the subtraction of integers related to the addition of integers?
6. If x and y are positive integers, is x – y always positive?
7. How is the distance between two rational numbers related to their difference?
8. When is the product of two or more integers a positive number?
9. How can properties be used to prove rules for multiplying integers?
10. How is dividing integers similar to multiplying integers?

Enduring Understandings:

5. Numeric fluency includes both the understanding of and the ability to appropriately use numbers.
6. Computational fluency includes understanding the meaning and the appropriate use of numerical operations.
7. A quantity can be represented numerically in various ways. Problem solving depends upon choosing wise ways to solve that problem.
8. Context is critical when using estimation.

Knowledge, Skills, and Instructional Objectives:

1. Use appropriate notation to indicate positive and negative number, to locate rational numbers on a number line and to understand the relationship between a rational number and its opposite.
2. Compare and Order rational numbers.
3. Understand that absolute value is the distance from zero on a number line.
4. Understand the relationship between a positive or negative number and its opposite (additive inverse).
5. Develop algorithms for adding integers.
6. Observe that the Commutative Property holds for addition of rational numbers.
7. Develop algorithms for subtracting integers.
8. Observe that the Commutative Property does not hold for subtraction of rational numbers.
9. Understand and use the relationship between addition and subtraction to simplify computation by changing subtraction problems into addition problems or vice versa.
10. Develop algorithms for multiplying integers.
11. Develop algorithms for dividing integers.
12. Explore the use of the order of operations to order computation in problems.

Instructional Materials/Resources:

Mathematics Course 2	Glencoe/McGraw-Hill	NJ Edition
Mathematics Course 3	Glencoe/McGraw-Hill	NJ Edition
Mathematics Connects Course 2	Glencoe/McGraw-Hill	NJ Edition
Pre-Algebra	Glencoe/McGraw-Hill	NJ Edition
Algebra 1	Glencoe/McGraw-Hill	
NJ Ask 7	Prentice Hall	Brief Review
Commom Core Coach Mathematics 7	Triumph Learning	NJ 1st Edition

Suggested Vocabulary

Absolute Value	Integer	Positive Integer
Additive Inverse	Negative Integer	Zero Pair
Graph	Opposites	

Technology:

ActivBoard (Promethean Planet)
Document Camera
Internet Sites (figurethis.org, mathcats.com, etc)
I-Pads (Math Ref, Motion Math, Quick Graph, Pi-Cubed, etc)
(Graphing) Calculators
WebQuests
8.1.2.A.4; 8.1.P.C.1

Recommended Instructional Activities:
Warm-ups (Do Nows)
Problem of the Day (Computational Short Constructed Response)
Problem of the Week (Written Extended Response)
Guided Practice (Classwork)
Independent Practice (Classwork)
Cooperative Group Activities
Homework Assignments
Reflection Journals

Extension Strategies/Activities:

21st Century Career Connections (Fashion Designer)
Real-World Application
Mathematics Station Activities: The Number Systems Sets 1 – 3 (Common Core Walch Education)

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Cross-curricular Connections/Standards:
RI.7.4.; NJSLSA.W2; W.7.2.; NJSLSA.SL1; SL.7.1

21st Century Skills
CRP1; CRP3; CRP6; CRP11; CRP12

Suggested Assessments:

Homework/Classwork	Performance-Based Assessments (with multi-step, problem-solving tasks)
Projects	Developmental and Summative Assessments

Expressions and Equations	**Strand:** Use properties of operations to generate equivalent expressions.

New Jersey Student Learning Standards:

CCSS.Math.Content.7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

CCSS.Math.Content.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."*

Big Ideas:

1. Students will use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.
2. Students will understand and use properties of operations to generate equivalent expressions.
3. Students will use and solve real-life mathematical problems using numerical and algebraic expressions and equations.
4. Students will use variables to represent quantities in a real-world or mathematical problem to construct and solve simple equations and inequalities in one and two step.
5. In gaining the understanding of solving the one and two-step equations and inequalities, students will reason about the quantity of their solutions.

Essential Questions:

- How can you communicate mathematical ideas effectively?
- How can you use numbers and symbols to represent mathematical ideas?
- Will the expression x – 3 and y – 3 sometimes, always or never represent the same value?
- What is the difference between the Commutative and Associative Properties?
- How is the formula for the perimeter of a rectangle an application of the Distributive Property?
- How is adding linear expressions similar to simplifying expressions?
- Why is 5, 9, 13, 17, 21, … considered an arithmetic sequence?
- How can geometric figures be used to model numerical patterns?
- Why are the expressions 2(x – 1) + 3(x – 1) and 5(x – 1) equivalent?
- How is adding linear expressions similar to simplifying expressions?
- How can you use the additive inverse to help you subtract linear expressions?
- How is GCF used to factor expressions?
- How do models help you factor linear expressions?

Enduring Understandings:

- Computational fluency includes understanding the meaning and the appropriate use of numerical operations.
- The symbolic language of algebra is used to communicate and generalize the patterns in mathematics.
- A quantity can be represented numerically in various ways.
- Problem solving depends upon choosing wise ways.

Knowledge, Skills, and Instructional Objectives:

1. Understanding the differences between a numerical expression and an algebraic expression.
2. Evaluating simple algebraic expressions.
3. Identify and use mathematical properties to simplify algebraic expressions.
4. Applying the Distributive Property to rewrite algebraic expressions.
5. Add and subtract linear expressions.
6. Describe the relationships and extend terms within arithmetic sequences.
7. Solve problems based on a pattern through tables involving numbers, objects and geometric figures.

Knowledge, Skills, and Instructional Objectives (con't):

8. Add and Subtract linear expressions

9. Use properties, algebra tiles or integer mats to model factoring of linear expressions.

Instructional Materials/Resources:

Mathematics Course 2	Glencoe/McGraw-Hill	NJ Edition
Mathematics Course 3	Glencoe/McGraw-Hill	NJ Edition
Mathematics Connects Course 2	Glencoe/McGraw-Hill	NJ Edition
Pre-Algebra	Glencoe/McGraw-Hill	NJ Edition
Algebra 1	Glencoe/McGraw-Hill	
NJ Ask 7	Prentice Hall	Brief Review
Commom Core Coach Mathematics 7	Triumph Learning	NJ 1st Edition

Suggested Vocabulary

Additive Identity Property	Multiplicative Property of Zero	Monomial
Associative Property	Algebraic Expression	Term
Commutative Property	Coefficient	Constant
Distributive Property	Multiplicative Identity Property	Like Terms
Arithmetic Sequence	Counter Example	Linear Expression
Geometric Sequence	Equivalent Expressions	Factor Form

Technology:

ActivBoard (Promethean Planet)
Document Camera
Internet Sites (figurethis.org, mathcats.com, etc)
I-Pads (Math Ref, Motion Math, Quick Graph, Pi-Cubed, etc)
(Graphing) Calculators
WebQuests
8.1.2.A.4; 8.1.P.C.1

Recommended Instructional Activities:
Warm-ups (Do Nows)
Problem of the Day (Computational Short Constructed Response)
Problem of the Week (Written Extended Response)
Guided Practice (Classwork)
Independent Practice (Classwork)
Cooperative Group Activities
Homework Assignments
Reflection Journals

Extension Strategies/Activities:

21st Century Career Connections (Animal Conservation)
Real-World Application
Mathematics Station Activities: Expressions and Equations — Sets 1 – 3 (Common Core Walch Education)
Vocabulary Cross-Word Puzzle

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Cross-curricular Connections/Standards:
RI.7.4.; NJSLSA.W2; W.7.2.; NJSLSA.SL1; SL.7.1

21st Century Skills
CRP1; CRP3; CRP6; CRP11; CRP12

Suggested Assessments:

Homework/Classwork	Performance-Based Assessments (with multi-step, problem-solving tasks)
Projects	Developmental and Summative Assessments

Expressions and Equations | **Strand:** Solve real-life and mathematical

	problems using numerical and algebraic expressions and equations.

New Jersey Student Learning Standards:

CCSS.Math.Content.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 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation*.

CCSS.Math.Content.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.

- CCSS.Math.Content.7.EE.B.4a Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*

- CCSS.Math.Content.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*.

Big Ideas:

1. Students will use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.
2. Students will understand and use properties of operations to generate equivalent expressions.
3. Students will use and solve real-life mathematical problems using numerical and algebraic expressions and equations.
4. Students will use variables to represent quantities in a real-world or mathematical problem to construct and solve simple equations and inequalities in one and two step.
5. In gaining the understanding of solving the one and two-step equations and inequalities, students will reason about the quantity of their solutions.

Essential Questions:

1. What does it mean to say two quantities are equal?
2. What are two methods for solving a real-world problem that can be represented by an equation?
3. How is the process for solving multiplication and division one-step equations like solving one-step addition and subtraction equations?
4. What is the process for solving a multiplication equation with a rational coefficient?
5. Why is it important to perform identical operations on each side of the equals sign when solving equations?
6. What is the difference between px + q = r and p(x + q) = r?
7. When would you use addition and subtraction to solve an inequality?

Essential Questions(con't):

8. When do you not reverse the inequality symbol when solving an inequality?
9. How are the inequalities and solutions of $2x + 8 > 18$ and $2x + 8 \leq 18$ similar and how are they different?

Enduring Understandings:

- Computational fluency includes understanding the meaning and the appropriate use of numerical operations.
- Algebraic representation can be used to generalize patterns and relationships.
- Mathematical models can beused to describeand quantifyphysical relationships.
- A quantity can be represented numerically in various ways.
- Problem solving depends upon choosing wise ways.

Knowledge, Skills, and Instructional Objectives:

1. Write and solve addition and subtraction equations using bar diagrams (algebra tiles or equation mats).
2. Solve and validate one-step addition and subtraction equations.
3. Use bar diagrams to solve problems involving ratios.
4. Solve and validate one-step multiplication and division equations.
5. Write and solve equations with rational coefficients with and without bar diagrams (algebra tiles or equation mats).
6. Write, solve and graph two-step equations in linear and p(x + q) = r forms.
7. Solving multi-step equations by working backwards.
8. Use models to solve problems involving inequalities.
9. Solving inequalities by using the Addition and Subtraction Properties of Inequalities.
10. Solving inequalities by using the Multiplication and Division Properties of Inequalities.

Instructional Materials/Resources:

Mathematics Course 2	Glencoe/McGraw-Hill	NJ Edition
Mathematics Course 3	Glencoe/McGraw-Hill	NJ Edition
Mathematics Connects Course 2	Glencoe/McGraw-Hill	NJ Edition
Pre-Algebra	Glencoe/McGraw-Hill	NJ Edition
Algebra 1	Glencoe/McGraw-Hill	
NJ Ask 7	Prentice Hall	Brief Review
Commom Core Coach Mathematics 7	Triumph Learning	NJ 1st Edition

Suggested Vocabulary

Addition Property of Equality	Division Property of Inequality	Multiplication Property of Inequality
Addition Property of Inequality	Equation	Solution
Coefficient	Equivalent equation formula	Subtraction Property of Equality
Division Property of Equality	Inequality	Subtraction Property of Inequality
	Multiplication Property of Equality	

Technology:

ActivBoard (Promethean Planet)
Document Camera
Internet Sites (figurethis.org, mathcats.com, etc)
I-Pads (Math Ref, Motion Math, Quick Graph, Pi-Cubed, etc)
(Graphing) Calculators
WebQuests
8.1.2.A.4; 8.1.P.C.1

Recommended Instructional Activities:

Warm-ups (Do Nows)
Problem of the Day (Computational Short Constructed Response)
Problem of the Week (Written Extended Response)
Guided Practice (Classwork)
Independent Practice (Classwork)
Cooperative Group Activities
Homework Assignments
Reflection Journals

Extension Strategies/Activities:

21st Century Career Connections (Veterinary Medicine)
Real-World Application
Mathematics Station Activities: Expressions and Equations Sets 1 – 3 (Common Core Walch Education)

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Cross-curricular Connections/Standards: RI.7.4.; NJSLSA.W2; W.7.2.; NJSLSA.SL1; SL.7.1 21st Century Skills CRP1; CRP3; CRP6; CRP11; CRP12
Suggested Assessments:

Homework/Classwork	Performance-Based Assessments (with multi-step, problem-solving tasks)
Projects	Developmental and Summative Assessments

Geometry	**Strand:** Draw construct, and describe geometrical figures and describe the relationships between them.
New Jersey Student Learning Standards:	

CCSS.Math.Content.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.

CCSS.Math.Content.7.G.A.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

CCSS.Math.Content.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.

Big Ideas:

1. Use algebraic rules to produce similar figures on a coordinate grid.
2. Understand the role multiplication plays in similarity relationships.
3. Understand the relationships of angles, side lengths, perimeters, and areas of similar polygons.
4. Use the area and circumference of a circle to solve problems and give an informal derivation of the relationship between a circle's area and its circumference.
5. Draw possible triangles when given three measures of their angles or sides noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
6. Describe two-dimensional cross sections of three-dimensional figures.
7. Use facts about complementary, vertical, and adjacent angles to write and solve simple equations for an unknown angle in a figure.
8. Use ratios of corresponding sides within a figure to determine whether two figures are similar.
9. Use ratios to identify similar triangles. Use ratios of corresponding sides or scale factors to find missing lengths in similar figures.

Essential Questions:

1. How does geometry help us describe real-world objects?
2. What are the differences between vertical and adjacent angles?
3. How are vertical, adjacent, complementary, supplementary angles related?
4. How can triangles be classified?
5. How can you use a map to estimate the actual distance between locations on a map?
6. How does drawing the different views (isometrics) of a solid figure help you to have a better understanding of the figure?
7. How can knowing the shape of the base of a solid help you name the figure?

Enduring Understandings:

1. Coordinate geometry can be used to represent and verify geometric/algebraic relationships.
2. Shape and area can be conserved during mathematical transformations.
3. Measurements can be used to describe, compare, and make sense of phenomena.
4. Geometric properties can be used to construct geometric figures.
5. Reasoning and/or proof can be used to verify or refute conjectures or theorems in geometry.
6. Everyday objects have a variety of attributes, each of which can be measured in many ways.

Knowledge, Skills, and Instructional Objectives:

Classify angles and identify vertical and adjacent angles.
Classify angles and determine whether adjacent angles are supplementary or complementary.
Identify and classify triangles and find missing angle measures.
Draw triangles using given angles or given side lengths.
Determine the scale being used in a drawing.
Solve real-life problems involving scale drawings.
Use online maps to reproduce a scale drawing at a different scale.
Sketch three-dimensional figures (solids) given the top, side and front views (isometric view).
Identify and draw solids.
Identify the faces, vertices, and edges of a solid.

Instructional Materials/Resources:

Mathematics Glencoe/McGraw- NJ Edition

Suggested Vocabulary

Acute angle
Acute triangle
Diagonal
Edge
Right angle
Right triangle

Course 3 Mathematics Connects Course 2	Glencoe/McGraw-Hill	NJ Edition
Pre-Algebra	Glencoe/McGraw-Hill	NJ Edition
Algebra 1	Glencoe/McGraw-Hill	
NJ Ask 7	Prentice Hall	Brief Review
Commom Core Coach Mathematics 7	Triumph Learning	NJ 1st Edition

Adjacent angles	Equilateral triangle	Scale
Base	Face	Scale drawing
Complementary angles	Isosceles triangle	Scale factor
Cone	Obtuse angle	Scale model
Congruent	Obtuse triangle	Scalene triangle
Congruent segments	Plane	Straight angle
Coplanar	Polyhedron	Supplementary angles
Cross section	Prism	Triangle
Cylinder	Pyramid	Vertex
		Vertical angles

Technology:

ActivBoard (Promethean Planet)
Document Camera
Internet Sites (figurethis.org, mathcats.com, etc)
I-Pads (Math Ref, Motion Math, Quick Graph, Pi-Cubed, etc)
(Graphing) Calculators
WebQuests
8.1.2.A.4; 8.1.P.C.1

Recommended Instructional Activities:
Warm-ups (Do Nows)
Problem of the Day (Computational Short Constructed Response)
Problem of the Week (Written Extended Response)
Guided Practice (Classwork)
Independent Practice (Classwork)
Cooperative Group Activities
Homework Assignments
Reflection Journals

Extension Strategies/Activities:

21st Century Career Connections (Roller Coaster Designer)
Real-World Application
Mathematics Station Activities: Geometry Sets 1 – 3 (Common Core Walch Education)
Vocabulary Cross-Word Puzzle

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Cross-curricular Connections/Standards:
RI.7.4.; NJSLSA.W2; W.7.2.; NJSLSA.SL1; SL.7.1

21st Century Skills
CRP1; CRP3; CRP6; CRP11; CRP12

Suggested Assessments:

Homework/Classwork	Performance-Based Assessments (with multi-step, problem-solving tasks)
Projects	Developmental and Summative Assessments

Geometry	**Strand** Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

New Jersey Student Learning Standards:

CCSS.Math.Content.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.

CCSS.Math.Content.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.

CCSS.Math.Content.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.

Big Ideas:

1. Visualize a net as a representation of the surface area of a cube.
2. Use the net of a rectangular prism to develop a strategy for finding the surface area.
3. Understand that rectangular prisms may have the same volume but different surface areas.
4. Predict which rectangular prism with a common volume will have the smallest surface area and refine a strategy for finding the surface area of a rectangular prism.
5. Develop a formula for finding the volume of a rectangular prism and a cylinder.
6. Develop a strategy for finding the surface area of a cylinder.

Essential Questions:

1. What is the relationship between the circumference and diameter of a circle?
2. How are the circumference and area of a circle alike? How are they different?
3. How can you tell if an answer is exact or an approximation?
4. How is finding the volume of a rectangular prism and the volume of a triangular prism alike? How are they different?
5. When you are finding the volume of a pyramid, why is it important to know the shape of the base of the pyramid?
6. Why is the surface area of a three-dimensional figure measured in square units instead of cubic units?
7. How can you justify the formula for the surface area of a pyramid?
8. How does determining measures of angles, side lengths, scales and isometric view help you find the surface area and volume of a composite figure or solid?

Enduring Understandings:

1. Coordinate geometry can be used to represent and verify geometric/algebraic relationships.
2. Shape and area can be conserved during mathematical transformations.
3. Measurements can be used to describe, compare, and make sense of phenomena.
4. Geometric properties can be used to construct geometric figures.
5. Reasoning and/or proof can be used to verify or refute conjectures or theorems in geometry.
6. Everyday objects have a variety of attributes, each of which can be measured in many ways.

Knowledge, Skills, and Instructional Objectives:

1. Describe the relationship between the diameter and circumference of a circle.
2. Develop a formula for the circumference of a circle.
3. Find the circumference of a circle using the diameter and radius.
4. Develop a formula for the area of a circle.
5. Find the area of a circle using the diameter and radius.
6. Determine the area of composite figures.
7. Determine the volume of prisms.
8. Justify the volume of a pyramid.
9. Determine the volume of a pyramid.
10. Attain the surface area of a prism using models and nets.

Knowledge, Skills, and Instructional Objectives (con't):

11. Determine the surface area of a prism.
12. Compare and contrast the volume and surface area of prisms.

13. Attain the surface area of a pyramid using models and nets.
14. Determine the surface area of a pyramid.
15. Compare and contrast the volume and surface area of pyramid.

Instructional Materials/Resources:

Mathematics Course 2	Glencoe/McGraw-Hill	NJ Edition
Mathematics Course 3	Glencoe/McGraw-Hill	NJ Edition
Mathematics Connects Course 2	Glencoe/McGraw-Hill	NJ Edition
Pre-Algebra	Glencoe/McGraw-Hill	NJ Edition
Algebra 1	Glencoe/McGraw-Hill	
NJ Ask 7	Prentice Hall	Brief Review
Commom Core Coach Mathematics 7	Triumph Learning	NJ 1st Edition

Suggested Vocabulary

Center	Lateral Face	Regular Pyramid
Circle	Lateral Surface Area	Semicircle
Circumference	Pi	Slant Height
Composite Figure	Pyramid	Surface Area
Diameter	Radius	Volume

Technology:

ActivBoard (Promethean Planet)
Document Camera
Internet Sites (figurethis.org, mathcats.com, etc)
I-Pads (Math Ref, Motion Math, Quick Graph, Pi-Cubed, etc)
(Graphing) Calculators
WebQuests
8.1.2.A.4; 8.1.P.C.1

Recommended Instructional Activities:
Warm-ups (Do Nows)
Problem of the Day (Computational Short Constructed Response)
Problem of the Week (Written Extended Response)
Guided Practice (Classwork)
Independent Practice (Classwork)
Cooperative Group Activities
Homework Assignments
Reflection Journals

Extension Strategies/Activities:

21st Century Career Connections (Landscape Architecture)
Real-World Application
Mathematics Station Activities: Geometry Sets 1 – 3 (Common Core Walch Education)
Vocabulary Cross-Word Puzzle

Cross-curricular Connections/Standards:
RI.7.4.; NJSLSA.W2; W.7.2.; NJSLSA.SL1; SL.7.1

21st Century Skills
CRP1; CRP3; CRP6; CRP11; CRP12

Suggested Assessments:

Homework/Classwork	Performance-Based Assessments (with multi-step, problem-solving tasks)
Projects	Developmental and Summative Assessments

Statistics and Probability	**Strand:** Use random sampling to draw inferences about a population.
New Jersey Student Learning Standards:	

CCSS.Math.Content.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.

CCSS.Math.Content.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*.

Big Ideas:
Draw inferences about a population based on data displayed in a dot plot.
Draw inferences about a population based on data displayed in a box plot.
Understand that information can be gained about a population by examining statistics of a representative sample of the population, where random sampling tends to produce representative samples.

Essential Questions:
1. How do you know which type of graph to use when displaying data?
2. When can statistics be used to gain information about a population from a sample?
3. How is using a survey one way to determine experimental probability?
4. What are ways in which the display of data can influence conclusions?

Enduring Understandings:
1. Grouping by attributes (classification) can be used to answer mathematical questions.
2. The results of a statistical investigation can be used to support or refute an argument.

Knowledge, Skills, and Instructional Objectives:
1. Predict the actions of a larger group by using a sample.
2. Determine whether sample methods are valid through unbiased and biased samples.
3. Analyze the variation in multiple samples of data.
4. Establish when statistics and graphs are misleading.

Instructional Materials/Resources:

Mathematics Course 2	Glencoe/McGraw-Hill	NJ Edition
Mathematics Course 3	Glencoe/McGraw-Hill	NJ Edition
Mathematics Connects Course 2	Glencoe/McGraw-Hill	NJ Edition
Pre-Algebra	Glencoe/McGraw-Hill	NJ Edition
Algebra 1	Glencoe/McGraw-Hill	
NJ Ask 7	Prentice Hall	Brief Review
Commom Core Coach Mathematics 7	Triumph Learning	NJ 1st Edition

Suggested Vocabulary

Biased sample	Population	Survey
Convenience sample	Sample	Systematic Random Sample
Double box plot	Simple random sample	Unbiased sample
Double dot plot	Statistics	Voluntary response sample

Technology:

ActivBoard (Promethean Planet)
Document Camera
Internet Sites (figurethis.org, mathcats.com, etc)
I-Pads (Math Ref, Motion Math, Quick Graph, Pi-Cubed, etc)
(Graphing) Calculators
WebQuests
8.1.2.A.4; 8.1.P.C.1

Recommended Instructional Activities:
Warm-ups (Do Nows)
Problem of the Day (Computational Short Constructed Response)
Problem of the Week (Written Extended Response)

Guided Practice (Classwork) Independent Practice (Classwork) Cooperative Group Activities Homework Assignments Reflection Journals
Extension Strategies/Activities: 21st Century Career Connections (Market Research) Real-World Application Mathematics Station Activities: Statistics & Probability Sets 1 – 3 (Common Core Walch Education) Vocabulary Cross-Word Puzzle •
Cross-curricular Connections/Standards: RI.7.4.; NJSLSA.W2; W.7.2.; NJSLSA.SL1; SL.7.1 21st Century Skills CRP1; CRP3; CRP6; CRP11; CRP12
Suggested Assessments: Homework/Classwork Performance-Based Assessments (with multi-step, problem-solving tasks) Projects Developmental and Summative Assessments

Statistics and Probability	**Strand:** Draw informal comparative inferences about two populations.
New Jersey Student Learning Standards:	

CCSS.Math.Content.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*.

CCSS.Math.Content.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*.

Big Ideas:
Draw inferences about a population based on data displayed in a dot plot.
Draw inferences about a population based on data displayed in a box plot.
Understand that information can be gained about a population by examining statistics of a representative sample of the population, where random sampling tends to produce representative samples.

Essential Questions:
1. How can you use data displays to compare two populations?
2. What are some of the factors to consider when selecting an appropriate display for a data set?

Enduring Understandings:
The results of a statistical investigation can be used to support or refute an argument.
The message conveyed by the data depends on how the data is collected, represented, and summarized.

Knowledge, Skills, and Instructional Objectives:
1. Compare two populations using box plots.
2. Analyze the visual overlap of two numerical data distributions.
3. Select, organize, and construct appropriate data displays.

Instructional Materials/Resources:

Mathematics Course 2	Glencoe/McGraw-Hill	NJ Edition
Mathematics Course 3	Glencoe/McGraw-Hill	NJ Edition
Mathematics Connects Course 2	Glencoe/McGraw-Hill	NJ Edition
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Suggested Vocabulary

Biased sample	Population	Survey
Convenience sample	Sample	Systematic Random Sample
Double box plot	Simple random sample	Unbiased sample
Double dot plot	Statistics	Voluntary response sample

Technology:

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Recommended Instructional Activities:
Warm-ups (Do Nows)
Problem of the Day (Computational Short Constructed Response)

Problem of the Week (Written Extended Response)
Guided Practice (Classwork)
Independent Practice (Classwork)
Cooperative Group Activities
Homework Assignments
Reflection Journals

Extension Strategies/Activities:

21st Century Career Connections (Medicine)
Real-World Application
Mathematics Station Activities: Statistics & Probability Sets 1 – 3 (Common Core Walch Education)
Vocabulary Cross-Word Puzzle

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C Cross-curricular Connections/Standards:
RI.7.4.; NJSLSA.W2; W.7.2.; NJSLSA.SL1; SL.7.1

21st Century Skills
CRP1; CRP3; CRP6; CRP11; CRP12

Suggested Assessments:

Homework/Classwork	Performance-Based Assessments (with multi-step, problem-solving tasks)
Projects	Developmental and Summative Assessments

Statistics and Probability	**Strand:** Investigate chance processes and develop, use, and evaluate probability models.

New Jersey Student Learning Standards:

CCSS.Math.Content.7.SP.C.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

CCSS.Math.Content.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*.

CCSS.Math.Content.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.

- CCSS.Math.Content.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*.

- CCSS.Math.Content.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?*

CCSS.Math.Content.7.SP.C.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

- CCSS.Math.Content.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.

- CCSS.Math.Content.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.

- CCSS.Math.Content.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?*

Big Ideas:

1. Understand that the probability of an event is the likelihood of the event occurring and is represented by a value between zero and one.
2. Use theoretical and experimental probability to calculate the long-term average result of a game of chance.
3. Conduct a simulation to determine the fairness of a game.
4. Use an area model to analyze the theoretical probabilities for two-stage outcomes.
5. Simulate and analyze probability situations involving two-stage outcomes.
6. Analyze a binomial situation.
7. Practice finding expected value in a multiple-stage probability situation.

Essential Questions:

1. How can predict the outcome of future events?
2. What is the relationship between the probability of an event and its complement?
3. How are experimental probability and theoretical probability alike?
4. How do tree diagrams, tables and lists help you find the probability of a compound event?
5. How is using a simuation related to experimental probability?
6. How does using the Fundamental Counting Principle compare to making a tree diagram?
7. How can you find the number of permutations (order is important) of a set of objects?
8. What is the difference between independent and dependent events?
9. How can one event impact a second event in a probability experiment?

Enduring Understandings:

3. Experimental results tend to approach theoretical probabilities after a large number of trials.
4. Grouping by attributes (classification) can be used to answer mathematical questions.
5. The results of a statistical investigation can be used to support or refute an argument.

Knowledge, Skills, and Instructional Objectives:

1. Find and interpret the probability of a simple event.
2. Use experiments to determine relative frequency.
3. Find and compare experimental and theoretical probabilities.
4. Use experimental and theoretical probabilities to decide whether a game is fair or unfair.
5. Determine the probabilities of compound events.
6. Perform probability simulations to model real-world situations involving uncertainty.
7. Use simulation to generate frequencies for a compound event.
8. Solve real-life problems by using spinners, number cubes, coins, etc.
9. Use multiplication to count outcomes and find their probabilities.
10. Determine the number of permutations of a set of objects and their probabilities.
11. Determine the probability of independent and dependent events.

Instructional Materials/Resources:

Mathematics Glencoe/McGraw- NJ Edition

Suggested Vocabulary

Complementary events Outcomes Simple events

Mathematics Course 3	Glencoe/McGraw-Hill	NJ Edition
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Compound event	Permutation	Simulation
Dependent events	Probability	Theoretical probability
Experimental probability	Random	Tree diagram
Fair	Relative frequency	Uniform probability model
Fundamental Counting Principle	Sample space	Unfair
Independent events		

Technology:

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Extension Strategies/Activities:

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Real-World Application
Mathematics Station Activities: Statistics & Probability — Sets 1 – 3 (Common Core Walch Education)
Vocabulary Cross-Word Puzzle

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Cross-curricular Connections/Standards:
RI.7.4.; NJSLSA.W2; W.7.2.; NJSLSA.SL1; SL.7.1

21st Century Skills
CRP1; CRP3; CRP6; CRP11; CRP12

Suggested Assessments:

Homework/Classwork	Performance-Based Assessments (with multi-step, problem-solving tasks)
Projects	Developmental and Summative Assessments

Modifications for SpEd/ELL/Students at Risk/Gifted Supports, Accommodations, and Modifications must be provided as stated in IEP, 504 Plan or I-Team Intervention Plan, and may include (but not limited to) the following: Presentation accommodations:	

- Listen to audio recordings instead of reading text
- Learn content from audio books, movies, videos and digital media instead of reading print versions
- Use alternate texts at lower readability level
- Work with fewer items per page or line and /or materials in a larger print size
- Use magnification device, screen reader, or Braille/Nemeth Code
- Use audio amplification device (e.g., hearing aide(s), auditory trainer, sound-field system(which may require teacher use of microphone)
- Be given a written lists of instructions
- Record a lesson, instead of taking notes
- Have another student share class notes with him
- Be given an outline of lesson
- Be given a copy of teacher's lecture notes
- Be given a study guide to assist in preparing for assessments
- Use visual presentations of verbal material, such as word webs and visual organizers
- Use manipulatives to teach or demonstrate concepts
- Have curriculum materials translated into native language

Response accommodations:

- Use sign language, a communication device, Braille, other technology, or native language other than English
- Dictate answers to a scribe
- Capture responses to an audio recorder
- Use a spelling dictionary or electronic spell-checker
- Use a word processor to type notes or give responses in class
- Use a calculator or table or "math facts"
- Respond directly in the test booklet rather than on an answer sheet.

Setting accommodations:

- Work or take a test in a different setting, such as quiet room with few distractions
- Sit where he learns best (for example, near the teacher, away from distractions)
- Use special lighting or acoustics
- Take a test in small group setting
- Use sensory tools such as an exercise band that can be looped around a chair's legs (so fidgety kids can kick it and quietly get their energy out)
- Use noise buffers such as headphones, earphones, or earplugs

Timing accommodations:

- Take more time to complete a task or a test
- Have extra time to process oral information and directions
- Take frequent breaks, such as after completing a task

Scheduling accommodations: • Take more time to complete a project • Take a test in several timed sessions or over several days • Take sections of a test in a different order • Take a test at a specific time of day **Organization skills accommodations:** • Use an alarm to help with time management • Mark texts with a highlighter • Have help coordinating assignments in a book or planner • Receive study skills instruction **Assignment modifications:** • Complete fewer or different homework problems than peers • Write shorter paper • Answer fewer or different test questions • Create alternate projects or assignments **Curriculum modifications:** • Learn different material (such as continuing to work on multiplication while classmates move on to fractions, or moving ahead to an extension concept/skill while classmates continue to work on a core skill) • Get graded or assessed using a different standard than the one for classmates	