

Quinton Township School District
Math
Grade 8 Algebra
[Pacing Guide](#)

Marking Period:	1	Unit Title:	Topic 1: Solving Equations and Inequalities	Pacing:	14 days
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Unit Summary: This unit will focus on linear equations and solving for a variable. Students will use their knowledge of inverse properties to solve simple and multi-step equations. Equations with variables on either side will be a topic of study. The concept of absolute value will be applied to linear equations and the process of solving them will be discussed. This unit also focuses on how to use properties of operations to generate equivalent inequalities. Students will solve real-life and mathematical problems using inequalities.

Objectives:

- Find the sum or product of two rational numbers and explain why the sum or product is rational.
- Find the sum or product of rational and irrational numbers and explain why the sum or product is irrational.
- Explain that each step in solving a linear equation follows from the asserted equality in the previous step.
- Create and solve linear equations with one variable using the properties of equality.
- Use the properties of equality to solve linear equations with a variable on both sides.
- Identify whether linear equations have one solution, infinitely many solutions, or no solution.
- Rearrange formulas and equations to highlight a quantity of interest by isolating the variable using the same reasoning used to solve equations.
- Use formulas and equations to solve problems.
- Create and solve inequalities in one variable.
- Interpret solutions to inequalities within the context.

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- Identify inequalities as true or false based on the number of solutions.
- Create and solve a system of inequalities.
- Interpret the solution to a compound inequality within a modeling context.

Essential Questions:

- What are real numbers, and how can you describe the results of operations on real numbers?
- How do you create equations and use them to solve problems?
- How do you create equations with a variable on both sides and use them to solve problems?
- How is rewriting literal equations useful when solving problems?
- How are the solutions of an inequality different from the solutions of an equation?
- What are compound inequalities and how are their solutions represented?
- Why does the solution for an absolute value equation or inequality typically result in a pair of equations or inequalities?

New Jersey Student Learning Standards

Mathematics Learning Targets: HSN.RN.B.3, HSA.CED.A.1, HSN.Q.A.2, HSA.CED.A.4, HSN.Q.A.3, HSA.REI.B.3

Mathematics Practices: MP.2, MP.3, MP.5

Interdisciplinary Connections: RI.CR.8.1

Career Readiness, Life Literacies, and Key Skills: 9.1.8.FP.5

Computer Science and Design Thinking: 8.1.8.DA.1, 9.4.8.TL.2

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
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1.1 - Operations on Real Numbers 1.2 - Solving Linear Equations 1.3 - Solving Equations with a Variable on Both Sides 1.4 - Literal Equations and Formulas 1.5 - Solving Inequalities in One Variable 1.6 - Compound Inequalities 1.7 - Absolute Value Equations and Inequalities	<i>enVision</i> Mathematics *Daily Review *Reteach to Build Understanding *Build Mathematical Literacy *Enrichment * <i>enVision</i> Stem Activity *Problem Solving Leveled-Reading Mat *Problem-Solving Reading Activity *Digital Math Tools Activities *Language Support Handguide *Listen and Look For *Home-School Connection	Student Textbook Additional Practice Workbook Notebook Pen/Pencil Index Cards TI-84 graphing calculators	● Smart Board Applications ● Google Applications ● Interactive student edition ● Today's Challenge ● Adaptive Practice ● Desmos ● IXL
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Assessments	
Formative Assessments ● Topic Performance Task ● Oral questioning ● Using questioning strategies in TE ● Reteach for Understanding ● Classwork & Basic Skill Practice ● Corrections & Reflections ● Kahoot!	Summative Assessments ● Topic One Performance Task/Assessment ● Lesson Quizzes Suggested skills to be assessed: <i>Solve simple equations and Inequalities</i>

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• Quizizz • Desmos • Rubric-for projects • Self-reflection • Adaptive practice- on-line Savvas resources • Exit Slip • HW	
Benchmark Assessments • District-assigned Benchmark Assessments (e.g. LinkIt, literacy screeners, content-specific benchmarks)	Alternative Assessments • Alternative Choice Projects • Oral Assessments

Differentiation			
Special Education	MLL	At Risk	Gifted and Talented
• Modify and accommodate as listed in student IEP or 504 plan. • Utilize wait time effectively. • Communicate clear, concise directions and repeat, reword, modify as necessary. • Use visual aids during lessons and small-group time. • Utilize open-ended questioning techniques. • Utilize extended time and/or reduce number of items given for homework, quizzes, and tests. • Vary formative assessment styles to drive next point of instruction.	• Basic Skills Instruction • Speech/Language Therapy • Rosetta Stone • Provide English/Native Language Dictionary for use. • Place with native-language-speaking teacher/paraprofessional as available. • Use target words and cognates to understand texts. • Remind students to underline passages and list words they don't understand. • Learn/Utilize/Display some words in the students' native language. • Provide and model sentence	• Basic Skills Instruction • Provide after-school tutoring services. • Hold fall and spring parent conferences. • Make modifications to instructional plans based on I and RS Plan. • Utilize wait time effectively. • Develop a record system to encourage good behavior and completion of work. • Utilize scaffolding to support instruction. • Provide counseling if necessary to help students cope with challenges. • Utilize strategic grouping with	• Promote self-initiated and self-directed learning for growth through independent projects. • Challenge students with age-appropriate texts at higher reading levels. • Allow for the development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. • Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture.

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• Create modified assessments. • Allow students to utilize online audio books, when appropriate. • Allow for collaboration through strategically selected groups. • Utilize assistive technology as appropriate. • Utilize graphic organizers. • Provide and model sentence frames/sentence starters. • Utilize manipulatives as necessary. • Provide breaks to allow for refocusing as necessary.	frames to help students participate in discussion. • Provide word banks to help students write. • Translate printed communications in native language for parents. • Hold conferences with translator present.	a positive academic role model. • Utilize graphic organizers.	
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Quinton Township School District
Math
Grade 8 Algebra

Marking Period:	1	Unit Title:	Topic 2: Linear Equations	Pacing:	14 days
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Unit Summary: In Topic 2, students will focus on their understanding of linear equations. Students will analyze descriptions of lines and write their equations in different forms.

Objectives:

- Write linear equations in two variables using slope- intercept form to represent the relationship between two quantities.
- Interpret the slope and the intercept of a linear model.

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- Write and graph linear equations in point-slope form.
- Analyze different forms of a line to interpret the slope and y-intercept of a linear model in the context of data.
- Write and graph linear equations in standard form.
- Use linear equations in standard form to interpret the x- and y-intercepts in the context of given data.

Essential Questions:

- What information does the slope-intercept form of a linear equation reveal about a line?
- What information does the point-slope form of a linear equation reveal about a line?
- What information does the standard form of a linear equation reveal about a line?
- How can the equations of lines help identify whether the lines are parallel, perpendicular, or neither?

New Jersey Student Learning Standards

Mathematics Learning Targets: HSA.CED.A.2, HSS.ID.C.7, HSA.REI.D10, HSA.CED.A.3

Mathematics Practices: MP.3, MP.4, MP.7

Interdisciplinary Connections: RI.MF.8.6.

Career Readiness, Life Literacies, and Key Skills: 9.1.8.CR.2

Computer Science and Design Thinking: 8.1.8.DA.1, 8.1.12.DA.1

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
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2.1 - Slope-Intercept Form 2.2 - Point-Slope Form 2.3 - Standard Form 2.4 - Parallel and Perpendicular Lines	<i>enVision</i> Mathematics *Daily Review *Reteach to Build Understanding *Build Mathematical Literacy *Enrichment * <i>enVision</i> Stem Activity *Problem Solving Levelled Reading Mat *Problem-Solving Reading Activity *Digital Math Tools Activities *Language Support Handguide *Listen and Look For *Home-School Connection	Student Textbook Additional Practice Workbook Notebook Pen/Pencil Index Cards TI-84 graphing calculators	● Smart Board Applications ● Google Applications ● Interactive student edition ● Today's Challenge ● Adaptive Practice ● Desmos ● IXL
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Assessments	
Formative Assessments ● Topic Performance Task ● Oral questioning ● Using questioning strategies in TE ● Reteach for Understanding ● Classwork & Basic Skill Practice ● Corrections & Reflections ● Kahoot!	Summative Assessments ● Topic 2 Performance Task/Assessment ● Lesson Quizzes Suggested skills to be assessed: <i>When a linear equation is written in slope- intercept form, $y = mx + b$, m is the slope, and the line intersects the y-axis at $(0, b)$, so the y- intercept is b.</i>

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• Quizizz • Desmos • Rubric-for projects • Self-reflection • Adaptive practice- on-line Savvas resources • Exit Slip • HW	<i>The point-slope form of a linear equation</i> <i>The standard form of a linear equation</i> <i>The equations of lines can be used to help identify whether the lines are parallel or perpendicular.</i>
Benchmark Assessments • District-assigned Benchmark Assessments (e.g. LinkIt, literacy screeners, content-specific benchmarks)	Alternative Assessments • Alternative Choice Projects • Oral Assessments

Differentiation			
Special Education	MLL	At Risk	Gifted and Talented
• Modify and accommodate as listed in student IEP or 504 plan. • Utilize wait time effectively. • Communicate clear, concise directions and repeat, reword, modify as necessary. • Use visual aids during lessons and small-group time. • Utilize open-ended questioning techniques. • Utilize extended time and/or reduce number of items given for homework, quizzes, and tests. • Vary formative assessment styles to drive next point of instruction. • Create modified assessments.	• Basic Skills Instruction • Speech/Language Therapy • Rosetta Stone • Provide English/Native Language Dictionary for use. • Place with native-language-speaking teacher/paraprofessional as available. • Use target words and cognates to understand texts. • Remind students to underline passages and list words they don't understand. • Learn/Utilize/Display some words in the students' native language. • Provide and model sentence frames to help students	• Basic Skills Instruction • Provide after-school tutoring services. • Hold fall and spring parent conferences. • Make modifications to instructional plans based on I and RS Plan. • Utilize wait time effectively. • Develop a record system to encourage good behavior and completion of work. • Utilize scaffolding to support instruction. • Provide counseling if necessary to help students cope with challenges. • Utilize strategic grouping with a positive academic role	• Promote self-initiated and self-directed learning for growth through independent projects. • Challenge students with age-appropriate texts at higher reading levels. • Allow for the development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. • Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture.

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• Allow students to utilize online audio books, when appropriate. • Allow for collaboration through strategically selected groups. • Utilize assistive technology as appropriate. • Utilize graphic organizers. • Provide and model sentence frames/sentence starters. • Utilize manipulatives as necessary. • Provide breaks to allow for refocusing as necessary.	participate in discussion. • Provide word banks to help students write. • Translate printed communications in native language for parents. • Hold conferences with translator present.	model. • Utilize graphic organizers.	
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Quinton Township School District
Math
Grade 8 Algebra

Marking Period:	1-2	Unit Title:	Topic 3: Linear Functions	Pacing:	16 Days
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Unit Summary: Topic 3 focuses on extending students' understanding of linear equations to linear functions. Students learn methods to write, graph, and transform linear functions. They also apply analytic methods to tabular and graphic data sets that have linear relationships.

Objectives:

- Understand that a relation is a function if each element of the domain is assigned to exactly one element in the range.
- Determine a reasonable domain and identify constraints on the domain based on the context of a real-world problem.
- Write and evaluate linear functions using function notation.
- Graph a linear function and relate the domain of a function to its graph.
- Interpret functions represented by graphs, tables, verbal descriptions, and function notation in terms of a context.
- Graph transformations of linear functions by identifying the effect of replacing $f(x)$ with $f(x) + k$, $f(x + k)$, $kf(x)$, and $f(kx)$ for specific values of k .
- Interpret the key features of the graph of a linear function and use them to write the function that the graph represents.
- Write arithmetic and geometric sequences both recursively and with an explicit formula.
- Use explicit formulas and recursive formulas to model real-world situations.
- Translate between explicit and recursive formulas.
- Fit a function to linear data shown in a scatter plot and use fitted functions to solve problems in the context of the data.
- Interpret the slope of a trend line within the context of data.
- Compute and interpret the correlation coefficient for linear data.
- Plot and analyze residuals to assess the fit of a function.

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- Distinguish between correlation and causation.

Essential Questions:

- What is a function?
- Why is domain and range important in defining a function?
- How can you identify a linear function?
- How does modifying the input or the output of a linear function rule transform its graph?
- How are arithmetic sequences related to linear functions?
- How can you use a scatter plot to describe the relationship between two data sets?
- How can you evaluate the goodness of fit of a line of best fit for a paired data set?

New Jersey Student Learning Standards

Mathematics Learning Targets: HSF.IF.A.1, HSA.CED.A.3, HSF.IF.A.2, HSF.IF.B.5, HSN.Q.A.2, HSF.BF.B.3, HSF.BF.A.1, HSF.IF.C.7.A, HSF.IF.A.3, HSF.BF.A.1.A, HSF.BF.A.2, HSF.LE.A.2, HSF.LE.A.1.B, HSF.LE.A.1, HSS.ID.B.6, HSS.ID.B.6.A, HSS.ID.B.6.C, HSS.ID.C.7, HSS.ID.B.6.B, HSS.ID.C.8, HSS.ID.C.9

Mathematics Practices: MP.1, MP.2, MP.7

Interdisciplinary Connections: SL.PE.8.1

Career Readiness, Life Literacies, and Key Skills: 9.1.8.EG.3, 9.1.8.FI.4

Computer Science and Design Thinking: 8.1.8.DA.1

Career Education: 9.2.8.CAP.11

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
3.1 - Domain and Range of Functions 3.2 - Linear Functions 3.3 - Transforming Linear Functions 3.4 - Arithmetic Sequences 3.5 - Scatter Plots and Lines of Fit 3.6 - Analyzing Lines of Fit	<i>enVision</i> Mathematics *Daily Review *Reteach to Build Understanding *Build Mathematical Literacy *Enrichment * <i>enVision</i> Stem Activity *Problem Solving Leveled Reading Mat *Problem-Solving Reading Activity *Digital Math Tools Activities *Language Support Handguide *Listen and Look For *Home-School Connection	Student Textbook Additional Practice Workbook Notebook Pen/Pencil Index Cards paper colored markers TI-84 graphing calculators	● Smart Board Applications ● Google Applications ● Interactive student edition ● Today's Challenge ● Adaptive Practice ● Desmos ● IXL

Assessments	
Formative Assessments ● Topic Performance Task ● Oral questioning ● Using questioning strategies in TE ● Reteach for Understanding ● Classwork & Basic Skill Practice	Summative Assessments ● Topic 3 Performance Task/Assessment ● Lesson Quizzes Suggested skills to be assessed:

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• Corrections & Reflections • Kahoot! • Quizizz • Desmos • Rubric-for projects • Self-reflection • Adaptive practice- on-line Savvas resources • Exit Slip • HW	<i>Linear functions can be represented in multiple ways, using words, tables, graphs, and rules.</i> <i>A transformation of a function maps each point of its graph to a new location.</i> <i>Recursive and explicit formulas are used to describe arithmetic sequences.</i> <i>When data presented in a scatter plot suggests a linear function, a line can be fitted to the data and a linear function can be written to represent the relationship.</i> <i>When a line is fitted to a set of data, the closer the data points are to the line, the stronger the correlation.</i>
Benchmark Assessments • District-assigned Benchmark Assessments (e.g. LinkIt, literacy screeners, content-specific benchmarks)	Alternative Assessments • Alternative Choice Projects • Oral Assessments

Differentiation			
Special Education	MLL	At Risk	Gifted and Talented
• Modify and accommodate as listed in student IEP or 504 plan. • Utilize wait time effectively. • Communicate clear, concise directions and repeat, reword, modify as necessary. • Use visual aids during	• Basic Skills Instruction • Speech/Language Therapy • Rosetta Stone • Provide English/Native Language Dictionary for use. • Place with native-language-speaking teacher/paraprofessional as	• Basic Skills Instruction • Provide after-school tutoring services. • Hold fall and spring parent conferences. • Make modifications to instructional plans based on I and RS Plan.	• Promote self-initiated and self-directed learning for growth through independent projects. • Challenge students with age-appropriate texts at higher reading levels. • Allow for the development

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lessons and small-group time. • Utilize open-ended questioning techniques. • Utilize extended time and/or reduce number of items given for homework, quizzes, and tests. • Vary formative assessment styles to drive next point of instruction. • Create modified assessments. • Allow students to utilize online audio books, when appropriate. • Allow for collaboration through strategically selected groups. • Utilize assistive technology as appropriate. • Utilize graphic organizers. • Provide and model sentence frames/sentence starters. • Utilize manipulatives as necessary. • Provide breaks to allow for refocusing as necessary.	available. • Use target words and cognates to understand texts. • Remind students to underline passages and list words they don't understand. • Learn/Utilize/Display some words in the students' native language. • Provide and model sentence frames to help students participate in discussion. • Provide word banks to help students write. • Translate printed communications in native language for parents. • Hold conferences with translator present.	• Utilize wait time effectively. • Develop a record system to encourage good behavior and completion of work. • Utilize scaffolding to support instruction. • Provide counseling if necessary to help students cope with challenges. • Utilize strategic grouping with a positive academic role model. • Utilize graphic organizers.	and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. • Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture.
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Quinton Township School District
Math
Grade 8 Algebra

Marking Period:	2	Unit Title:	Topic 4: Systems of Linear Equations and Inequalities	Pacing:	17
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Unit Summary: In Topic 4, students extend their understanding of linear equations and inequalities to systems of linear equations and inequalities. Students learn methods to solve systems of linear equations and inequalities. Students identify when each solution method is most useful.

Objectives:

- Graph systems of linear equations in two variables to find an approximate solution.
- Write a system of linear equations in two variables to represent real-world problems.
- Use the substitution method to solve systems of equations.
- Represent situations as systems of equations and interpret solutions as viable/nonviable options for the situation.
- Solve systems of linear equations by elimination and prove that the sum of one equation and a multiple of the other produces a system with the same solutions as the original system.
- Represent constraints with a system of equations in a modeling context.
- Graph solutions to linear inequalities in two variables.
- Represent constraints with inequalities and interpret solutions as viable or nonviable options in a modeling context.
- Graph the solution set of a system of linear inequalities in two variables.
- Interpret solutions of linear inequalities in a modeling context.

Essential Questions:

- How can you use a graph to illustrate the solution to a system of linear equations?
- How do you use substitution to solve a system of linear equations?
- Why does the elimination method work when solving a system of equations?
- How does the graph of a linear inequality in two variables help you identify the solutions of the inequality?
- How is the graph of a system of linear inequalities related to the solutions of the system of inequalities?

New Jersey Student Learning Standards**Mathematics Learning Targets:** HSA.REI.C.6, HSA.REI.D.11, HSA.CED.A.3, HSA.REI.C.5, HSA.REI.D.12**Mathematics Practices:** MP.2, MP.4, MP.7**Interdisciplinary Connections:** SL.PE.8.1**Career Readiness, Life Literacies, and Key Skills:** 9.1.8.CDM.2**Computer Science and Design Thinking:** 9.4.8.IML.4, 8.1.8.DA.1, 9.4.8.TL.2

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
4.1 - Solving Systems of Equations by Graphing 4.2 - Solving Systems of Equations by Substitution 4.3 - Solving Systems of Equations by Elimination 4.4 - Linear Inequalities in	<i>enVision</i> Mathematics *Daily Review *Reteach to Build Understanding *Build Mathematical Literacy *Enrichment	Student Textbook Additional Practice Workbook Notebook Pen/Pencil	• Smart Board Applications • Google Applications • Interactive student edition • Today's Challenge • Adaptive Practice

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Two Variables 4.5 - Systems of Linear Inequalities	*<i>enVision</i> Stem Activity *Problem Solving Leveled Reading Mat *Problem-Solving Reading Activity *Digital Math Tools Activities *Language Support Handguide *Listen and Look For *Home-School Connection	Index Cards TI-84 graphing calculators	● Desmos ● IXL
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Assessments	
Formative Assessments ● Topic Performance Task ● Oral questioning ● Using questioning strategies in TE ● Reteach for Understanding ● Classwork & Basic Skill Practice ● Corrections & Reflections ● Kahoot! ● Quizizz ● Desmos ● Rubric-for projects ● Self-reflection ● Adaptive practice- on-line Savvas resources	Summative Assessments ● Topic 4 Performance Task/Assessment ● Lesson Quizzes Suggested skills to be assessed: <i>The intersection of the graphs of a pair of linear equations is used to estimate the solution to the system.</i> <i>Substitution method for solving systems of equations.</i> <i>Elimination is a method for solving systems of equations</i> <i>The graph of a linear inequality in two variables shows the solutions of the inequality as a half-plane above or below the boundary line.</i>

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• Exit Slip • HW	<i>Systems of linear inequalities can be solved by graphing.</i>
Benchmark Assessments • District-assigned Benchmark Assessments (e.g. LinkIt, literacy screeners, content-specific benchmarks)	Alternative Assessments • Alternative Choice Projects • Oral Assessments

Differentiation			
Special Education	MLL	At Risk	Gifted and Talented
• Modify and accommodate as listed in student IEP or 504 plan. • Utilize wait time effectively. • Communicate clear, concise directions and repeat, reword, modify as necessary. • Use visual aids during lessons and small-group time. • Utilize open-ended questioning techniques. • Utilize extended time and/or reduce number of items given for homework, quizzes, and tests. • Vary formative assessment styles to drive next point of instruction. • Create modified assessments.	• Basic Skills Instruction • Speech/Language Therapy • Rosetta Stone • Provide English/Native Language Dictionary for use. • Place with native-language-speaking teacher/paraprofessional as available. • Use target words and cognates to understand texts. • Remind students to underline passages and list words they don't understand. • Learn/Utilize/Display some words in the students' native language. • Provide and model sentence frames to help students participate in discussion. • Provide word banks to help	• Basic Skills Instruction • Provide after-school tutoring services. • Hold fall and spring parent conferences. • Make modifications to instructional plans based on I and RS Plan. • Utilize wait time effectively. • Develop a record system to encourage good behavior and completion of work. • Utilize scaffolding to support instruction. • Provide counseling if necessary to help students cope with challenges. • Utilize strategic grouping with a positive academic role model. • Utilize graphic organizers.	• Promote self-initiated and self-directed learning for growth through independent projects. • Challenge students with age-appropriate texts at higher reading levels. • Allow for the development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. • Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture.

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• Allow students to utilize online audio books, when appropriate. • Allow for collaboration through strategically selected groups. • Utilize assistive technology as appropriate. • Utilize graphic organizers. • Provide and model sentence frames/sentence starters. • Utilize manipulatives as necessary. • Provide breaks to allow for refocusing as necessary.	• students write. • Translate printed communications in native language for parents. • Hold conferences with translator present.		
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Quinton Township School District
Math
Grade 8 Algebra

Marking Period:	3	Unit Title:	Topic 5: Piecewise Functions	Pacing:	16 Days
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Unit Summary: In Topic five, the focus is on extending the concept of functions to include absolute value functions and other piecewise defined functions. Students identify the characteristics of each of these types of functions and understand that transformations can be applied to these functions.

Objectives:

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- Graph an absolute value function and identify the key features of the graph.
- Calculate and interpret the rate of change of an absolute value function over a specified interval.
- Understand and graph piecewise-defined functions.
- Analyze the key features of the graph of a piecewise-defined function.
- Write and interpret a piecewise-defined function to solve application problems.
- Graph step functions including ceiling functions and floor functions.
- Calculate and interpret the average rate of change of step functions.
- Graph transformations of piecewise-defined functions.
- Identify the effect of changing constants and coefficients of absolute value functions on their graphs.

Essential Questions:

- What are the key features of the graph of the absolute value function?
- What are the key features of piecewise-defined functions?
- How are the step functions related to piecewise-defined functions?
- How do the constants affect the graphs of piecewise-defined functions?

New Jersey Student Learning Standards

Mathematics Learning Targets: HSF.IF.B.4, HSF.IF.C.7.B, HSF.IF.B.6, HSF.IF.A.2, HSF.IF.B.6, HSF.BF.B.3, HSF.IF.C.9

Mathematics Practices: MP.2, MP.4, MP.7, MP.8

Interdisciplinary Connections: RI.CR.8.1, SL.PE.8.1

Career Readiness, Life Literacies, and Key Skills: 9.1.8.FP.5

Computer Science and Design Thinking: 9.4.8.IML.5, 8.1.8.DA.1

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
5.1 - The Absolute Value Function 5.2 - Piecewise-Defined Functions 5.3 - Step Functions 5.4 - Transformations of Piecewise-Defined Functions	<i>enVision</i> Mathematics *Daily Review *Reteach to Build Understanding *Build Mathematical Literacy *Enrichment * <i>enVision</i> Stem Activity *Problem Solving Leveled Reading Mat *Problem-Solving Reading Activity *Digital Math Tools Activities *Language Support Handguide *Listen and Look For *Home-School Connection	Student Textbook Additional Practice Workbook Notebook Pen/Pencil Index Cards TI-84 graphing calculators	● Smart Board Applications ● Google Applications ● Interactive student edition ● Today's Challenge ● Adaptive Practice ● Desmos ● IXL

Assessments	
Formative Assessments ● Topic Performance Task ● Oral questioning ● Using questioning strategies in TE ● Reteach for Understanding ● Classwork & Basic Skill Practice	Summative Assessments ● Topic 5 Performance Task/Assessment ● Lesson Quizzes Suggested skills to be assessed:

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• Corrections & Reflections • Kahoot! • Quizizz • Desmos • Rubric-for projects • Self-reflection • Adaptive practice- on-line Savvas resources • Exit Slip • HW	<i>How to graph and identify key features of absolute value functions.</i> <i>Analyze piecewise functions.</i> <i>Graph and understand function transformations.</i>
Benchmark Assessments • District-assigned Benchmark Assessments (e.g. LinkIt, literacy screeners, content-specific benchmarks)	Alternative Assessments • Alternative Choice Projects • Oral Assessments

Differentiation			
Special Education	MLL	At Risk	Gifted and Talented
• Modify and accommodate as listed in student IEP or 504 plan. • Utilize wait time effectively. • Communicate clear, concise directions and repeat, reword, modify as necessary. • Use visual aids during lessons and small-group time. • Utilize open-ended questioning techniques. • Utilize extended time and/or reduce number of items given for homework, quizzes, and tests.	• Basic Skills Instruction • Speech/Language Therapy • Rosetta Stone • Provide English/Native Language Dictionary for use. • Place with native-language-speaking teacher/paraprofessional as available. • Use target words and cognates to understand texts. • Remind students to underline passages and list words they don't understand. • Learn/Utilize/Display some words in the students' native	• Basic Skills Instruction • Provide after-school tutoring services. • Hold fall and spring parent conferences. • Make modifications to instructional plans based on I and RS Plan. • Utilize wait time effectively. • Develop a record system to encourage good behavior and completion of work. • Utilize scaffolding to support instruction. • Provide counseling if necessary to help students	• Promote self-initiated and self-directed learning for growth through independent projects. • Challenge students with age-appropriate texts at higher reading levels. • Allow for the development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. • Provide for the development of self-understanding of one's relationships with people,

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• Vary formative assessment styles to drive next point of instruction. • Create modified assessments. • Allow students to utilize online audio books, when appropriate. • Allow for collaboration through strategically selected groups. • Utilize assistive technology as appropriate. • Utilize graphic organizers. • Provide and model sentence frames/sentence starters. • Utilize manipulatives as necessary. • Provide breaks to allow for refocusing as necessary.	language. • Provide and model sentence frames to help students participate in discussion. • Provide word banks to help students write. • Translate printed communications in native language for parents. • Hold conferences with translator present.	cope with challenges. • Utilize strategic grouping with a positive academic role model. • Utilize graphic organizers.	societal institutions, nature and culture.
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Quinton Township School District
Math
Grade 8 Algebra

Marking Period:	3	Unit Title:	Topic 6: Exponents and Exponential Functions	Pacing:	15 Days
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Unit Summary: Topic 6 focuses on extending knowledge of functions to include the exponential function. Students learn to identify, write, graph, and transform exponential functions. Students use exponential functions to model real world situations to make predictions.

Objectives:

- Extend the properties of integer exponents to rational exponents to rewrite radical expressions using rational exponents.
- Solve equations with rational exponents using the properties of exponents.
- Sketch graphs showing key features of exponential functions.
- Write exponential functions using tables and graphs.
- Compare linear and exponential functions.
- Construct exponential growth and decay functions given a description of a relationship.
- Recognize if a situation can be modeled with exponential growth or exponential decay, and interpret the parameters of the model in context.
- Find explicit and recursive formulas for geometric sequences.
- Translate between recursive and explicit formulas for geometric sequences.
- Construct exponential functions to represent geometric sequences.
- Translate the graph of an exponential function vertically and horizontally, identifying the effect different values of h and k have on the graph of the function.
- Compare characteristics of two exponential functions represented in different ways, such as tables and graphs.

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- Use mathematical modeling to represent a problem situation and to propose a solution.
- Test and verify the appropriateness of their math models.
- Explain why the results from their mathematical models might not align exactly with the problem situation.

Essential Questions:

- What are the properties of rational exponents and how are they used to solve problems?
- What are the characteristics of exponential functions?
- What kinds of situations can be modeled with exponential growth or exponential decay functions?
- How are geometric sequences related to exponential functions?
- How do the changes in an exponential function relate to translations of its graph?

New Jersey Student Learning Standards

Mathematics Learning Targets: HSN.RN.A.1, HSN.RN.A.2, HSN.Q.A.1, HSF.IF.B.4, HSF.IF.B.5, HSF.IF.B.6, HSF.BF.A.1, HSF.LE.A.1, HSF.LE.A.1.A, HSF.IF.A.3, HSF.BF.A.2, HSF.LE.A.2, HSF.BF.B.3, HSF.IF.B.4, HSF.IF.C.7.E, HSF.IF.C.9

Mathematics Practices: MP.1, MP.3, MP.7, MP.8

Interdisciplinary Connections: RI.CR.8.1, SL.PE.8.1.

Career Readiness, Life Literacies, and Key Skills: 9.1.8.CDM.3, 9.1.8.FI.4

Computer Science and Design Thinking:8.1.8.DA.1, 8.1.12.DA.1

Career Education: 9.2.8.CAP.20

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
6.1 - Rational Exponents and Properties of Exponents 6.2 - Exponential Functions 6.3 - Exponential Growth and Decay 6.4 - Geometric Sequences 6.5 - Transformations of Exponential Functions	<i>enVision</i> Mathematics *Daily Review *Reteach to Build Understanding *Build Mathematical Literacy *Enrichment * <i>enVision</i> Stem Activity *Problem Solving Leveled Reading Mat *Problem-Solving Reading Activity *Digital Math Tools Activities *Language Support Handguide *Listen and Look For *Home-School Connection	Student Textbook Additional Practice Workbook Notebook Pen/Pencil Index Cards TI-84 graphing calculators	● Smart Board Applications ● Google Applications ● Interactive student edition ● Today's Challenge ● Adaptive Practice ● Desmos ● IXL

Assessments

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Formative Assessments • Topic Performance Task • Oral questioning • Using questioning strategies in TE • Reteach for Understanding • Classwork & Basic Skill Practice • Corrections & Reflections • Kahoot! • Quizizz • Desmos • Rubric-for projects • Self-reflection • Adaptive practice- on-line Savvas resources • Exit Slip • HW	Summative Assessments • Topic 6 Performance Task/Assessment • Lesson Quizzes Suggested skills to be assessed: <i>Radicals can be written using rational exponents.</i> <i>The properties of exponents can be used to solve equations with rational exponents.</i> <i>An exponential function models the relationship between two quantities that differ by a constant ratio.</i> <i>Exponential functions are modeled using $f(x) = ab^x$ where a is the initial amount and b is the constant ratio.</i> <i>An exponential growth function increases by a fixed percent over each interval.</i>
Benchmark Assessments • District-assigned Benchmark Assessments (e.g. LinkIt, literacy screeners, content-specific benchmarks)	Alternative Assessments • Alternative Choice Projects • Oral Assessments

Differentiation			
Special Education	MLL	At Risk	Gifted and Talented
• Modify and accommodate as listed in student IEP or 504	• Basic Skills Instruction • Speech/Language Therapy	• Basic Skills Instruction • Provide after-school tutoring	• Promote self-initiated and self-directed learning for

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plan. • Utilize wait time effectively. • Communicate clear, concise directions and repeat, reword, modify as necessary. • Use visual aids during lessons and small-group time. • Utilize open-ended questioning techniques. • Utilize extended time and/or reduce number of items given for homework, quizzes, and tests. • Vary formative assessment styles to drive next point of instruction. • Create modified assessments. • Allow students to utilize online audio books, when appropriate. • Allow for collaboration through strategically selected groups. • Utilize assistive technology as appropriate. • Utilize graphic organizers. • Provide and model sentence frames/sentence starters. • Utilize manipulatives as necessary. • Provide breaks to allow for refocusing as necessary.	• Rosetta Stone • Provide English/Native Language Dictionary for use. • Place with native-language-speaking teacher/paraprofessional as available. • Use target words and cognates to understand texts. • Remind students to underline passages and list words they don't understand. • Learn/Utilize/Display some words in the students' native language. • Provide and model sentence frames to help students participate in discussion. • Provide word banks to help students write. • Translate printed communications in native language for parents. • Hold conferences with translator present.	services. • Hold fall and spring parent conferences. • Make modifications to instructional plans based on I and RS Plan. • Utilize wait time effectively. • Develop a record system to encourage good behavior and completion of work. • Utilize scaffolding to support instruction. • Provide counseling if necessary to help students cope with challenges. • Utilize strategic grouping with a positive academic role model. • Utilize graphic organizers.	growth though independent projects. • Challenge students with age-appropriate texts at higher reading levels. • Allow for the development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. • Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture.
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Quinton Township School District
Math
Grade 8 Algebra

Marking Period:	4	Unit Title:	Topic 7: Polynomials and Factoring	Pacing:	20 Days
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Unit Summary: In Topic 7, students focus on extending polynomials. Students identify the parts and factors of polynomials. Students understand how to factor trinomials using the greatest common factor, binomial factors, and special patterns. Students learn methods to add, subtract, and multiply polynomials.

Objectives:

- Identify the parts of a polynomial, such as coefficients, variables, and constants.
- Classify polynomials by number of terms and by degree.
- Write a polynomial in standard form.

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- Add or subtract two polynomials and recognize that polynomials are closed under addition and subtraction, just as the integers are.
- Use the Distributive Property with polynomials, recognizing that polynomials are closed under multiplication.
- Multiply polynomials using a table and an area model.
- Determine the square of a binomial.
- Find the product of a sum and difference of two squares.
- Solve real-world problems involving the square of a binomial.
- Find the greatest common factor of the terms of a polynomial.
- Use the structure of a polynomial to rewrite it in factored form.
- Factor polynomials that represent real-world problems.
- Factor a trinomial in the form x^2+bx+x by finding two binomial factors whose product is equal to the trinomial.
- Identify and use patterns in the signs of the coefficients of the terms of a trinomial expression.
- Use mathematical modeling to represent a problem situation and to propose a solution.
- Test and verify the appropriateness of their math models.
- Explain why the results from their mathematical models might not align exactly with the problem situation.
- Identify the common factor of the coefficients in the terms of a trinomial expression when a does not equal 1.
- Write a quadratic trinomial as a product of two binomial factors.
- Identify and factor a trinomial that is a perfect square or a binomial that is a difference of two squares.
- Factor special cases of polynomials within the context of real-world problems.

Essential Questions:

- How does adding or subtracting polynomials compare to adding or subtracting integers?
- How does multiplying polynomials compare to multiplying integers?
- What patterns are there in the product of the square of a binomial and the product of a sum and a difference?
- How is factoring a polynomial similar to factoring integers?
- How does recognizing patterns in the signs of the terms help you factor polynomials?
- How is factoring a quadratic trinomial when $a \neq 1$ similar to factoring a quadratic trinomial when $a=1$?

- What special patterns are helpful when factoring a perfect-square trinomial and the difference of two squares?

New Jersey Student Learning Standards

Mathematics Learning Targets: HSA.APR.A.1, HSA.SSE.A.2, HSA.SSE.A.1, HSA.SSE.A.1.A, HSA.SSE.A.1.B

Mathematics Practices: MP.2, MP.3, MP.7

Interdisciplinary Connections: RI.CR.8.1

Career Readiness, Life Literacies, and Key Skills: 9.1.8.FP.5

Computer Science and Design Thinking: 9.4.8.IML.4, 8.1.8.DA.1

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
7.1 - Adding and Subtracting Polynomials	<i>enVision</i> Mathematics	Student Textbook	● Smart Board Applications ● Google Applications ● Interactive student edition ● Today's Challenge ● Adaptive Practice ● Desmos ● IXL
7.2 - Multiplying Polynomials	*Daily Review	Additional Practice Workbook	
7.3 - Multiplying Special Cases	*Reteach to Build Understanding		
7.4 - Factoring Polynomials	*Build Mathematical Literacy	Notebook	
7.5 - Factoring $x^2 + bx + c$	*Enrichment	Pen/Pencil	
7.6 - Factoring $ax^2 + bx + c$	* <i>enVision</i> Stem Activity		
7.7 - Factoring Special Cases	*Problem Solving Leveled Reading Mat	Index Cards	
	*Problem-Solving Reading		

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	Activity *Digital Math Tools Activities *Language Support Handguide *Listen and Look For *Home-School Connection	TI-84 graphing calculators	
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Assessments	
Formative Assessments • Topic Performance Task • Oral questioning • Using questioning strategies in TE • Reteach for Understanding • Classwork & Basic Skill Practice • Corrections & Reflections • Kahoot! • Quizizz • Desmos • Rubric-for projects • Self-reflection • Adaptive practice- on-line Savvas resources • Exit Slip • HW	Summative Assessments • Topic 7 Performance Task/Assessment • Lesson Quizzes Suggested skills to be assessed: <i>A polynomial is a monomial or the sum or differences of two or more monomials (terms).</i> <i>Polynomials can be added or subtracted by combining like terms.</i> <i>Polynomials are closed under addition or subtraction, similar to integers.</i> <i>Polynomials can be multiplied by applying the Distributive Property or by using a table.</i> <i>The product of the square of a binomial in the form $(a + b)^2$</i> <i>The product of a sum and a difference of two binomials in the form $(a + b)(a - b)$ is always the difference of two squares.</i> <i>The greatest common factor of the terms of a polynomial.</i> <i>Factoring a trinomial in the form $x^2 + bx + c$.</i> <i>Factoring a quadratic trinomial in the form $ax^2 + bx + c$</i>

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	<i>Identify different trinomial patterns and apply factoring techniques.</i>
Benchmark Assessments District-assigned Benchmark Assessments (e.g. LinkIt, literacy screeners, content-specific benchmarks)	Alternative Assessments - Alternative Choice Projects - Oral Assessments

Differentiation			
Special Education	MLL	At Risk	Gifted and Talented
- Modify and accommodate as listed in student IEP or 504 plan. - Utilize wait time effectively. - Communicate clear, concise directions and repeat, reword, modify as necessary. - Use visual aids during lessons and small-group time. - Utilize open-ended questioning techniques. - Utilize extended time and/or reduce number of items given for homework, quizzes, and tests. - Vary formative assessment styles to drive next point of instruction. - Create modified assessments.	- Basic Skills Instruction - Speech/Language Therapy - Rosetta Stone - Provide English/Native Language Dictionary for use. - Place with native-language-speaking teacher/paraprofessional as available. - Use target words and cognates to understand texts. - Remind students to underline passages and list words they don't understand. - Learn/Utilize/Display some words in the students' native language. - Provide and model sentence frames to help students	- Basic Skills Instruction - Provide after-school tutoring services. - Hold fall and spring parent conferences. - Make modifications to instructional plans based on I and RS Plan. - Utilize wait time effectively. - Develop a record system to encourage good behavior and completion of work. - Utilize scaffolding to support instruction. - Provide counseling if necessary to help students cope with challenges. - Utilize strategic grouping with a positive academic role	- Promote self-initiated and self-directed learning for growth through independent projects. - Challenge students with age-appropriate texts at higher reading levels. - Allow for the development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. - Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture.

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• Allow students to utilize online audio books, when appropriate. • Allow for collaboration through strategically selected groups. • Utilize assistive technology as appropriate. • Utilize graphic organizers. • Provide and model sentence frames/sentence starters. • Utilize manipulatives as necessary. • Provide breaks to allow for refocusing as necessary.	participate in discussion. • Provide word banks to help students write. • Translate printed communications in native language for parents. • Hold conferences with translator present.	model. • Utilize graphic organizers.	
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Quinton Township School District
Math
Grade 8 Algebra

Marking Period:	4	Unit Title:	Topic 8: Quadratic Functions	Pacing:	18 Days
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Unit Summary: In Topic 8, students will extend previous understanding of functions to include quadratic functions: graphing them, using them to model real-world situations, and comparing them to linear and exponential functions.

Objectives:

- Identify key features of the graph of a quadratic function using graphs, tables, and equations.
- Explain the effect of the value of a on the quadratic parent function.
- Identify key features of the graph of quadratic functions written in vertex form.
- Graph quadratic functions in vertex form.
- Graph quadratic functions in standard form and show intercepts, maxima, and minima.
- Determine how the values of a, b, and c affect the graph of $f(x)=ax^2+bx+c$.
- Identify key features of parabolas.
- Compare properties of quadratic functions presented in different forms (algebraically, in a table, graphically).
- Use quadratic functions fitted to data to model real-world situations.
- Use the vertical motion model to write an equation.
- Compare a model to a data set by analyzing and evaluating residuals.
- Use mathematical modeling to represent a problem situation and to propose a solution.
- Test and verify the appropriateness of their math models.
- Explain why the results from their mathematical models might not align exactly with the problem situation.
- Determine which model - linear, exponential, or quadratic - best fits a set of data.

- Use fitted function to solve problems in the context of data.

Essential Questions:

- What is the quadratic parent function and how can you recognize the key features of its graph?
- How can the vertex form of a quadratic function help you sketch the graph of a function?
- How is the standard form of a quadratic function different from the vertex form?
- What kinds of real-world situations can be modeled by quadratic functions?
- How can you determine whether a linear, exponential, or quadratic function best models data?

New Jersey Student Learning Standards

Mathematics Learning Targets: HSA.CED.A.2, HSF.BF.B.3, HSF.IF.B.6, HSF.IF.C.7.A, HSF.IF.B.4, HSF.IF.C.8, HSF.IF.C.9, HSF.BF.A.1, HSS.ID.B.6.A, HSS.ID.B.6.B, HSF.IF.A.2, HSF.LE.A.3

Mathematics Practices: MP.2, MP.4, MP.7, MP.8

Interdisciplinary Connections: RI.CR.8.1

Career Readiness, Life Literacies, and Key Skills: 9.1.8.FP.5

Computer Science and Design Thinking: 9.4.8.IML.3, 8.1.8.DA.1

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
8.1 - Key Features of a Quadratic Function	<i>enVision</i> Mathematics *Daily Review	Student Textbook	• Smart Board Applications

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8.2 - Quadratic Functions in Vertex Form 8.3 - Quadratic Functions in Standard Form 8.4 - Modeling with Quadratic Functions 8.5 - Linear, Exponential, and Quadratic Models	*Reteach to Build Understanding *Build Mathematical Literacy *Enrichment *enVision Stem Activity *Problem Solving Leveled-Reading Mat *Problem-Solving Reading Activity *Digital Math Tools Activities *Language Support Handguide *Listen and Look For *Home-School Connection	Additional Practice Workbook Notebook Pen/Pencil Index Cards TI-84 graphing calculators	● Google Applications ● Interactive student edition ● Today's Challenge ● Adaptive Practice ● Desmos ● IXL
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Assessments	
Formative Assessments ● Topic Performance Task ● Oral questioning ● Using questioning strategies in TE ● Reteach for Understanding ● Classwork & Basic Skill Practice ● Corrections & Reflections ● Kahoot! ● Quizizz ● Desmos	Summative Assessments ● Topic 8 Performance Task/Assessment ● Lesson Quizzes Suggested skills to be assessed: <i>A quadratic function is a polynomial function in one or more variables in which the highest degree term is of the second degree.</i> <i>The graph of a quadratic function $f(x) = ax^2$ is a parabola.</i>

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● Rubric-for projects ● Self-reflection ● Adaptive practice- on-line Savvas resources ● Exit Slip ● HW	<i>The value of the leading coefficient “a” determines both the width of the parabola and the direction the parabola opens(upward or downward).</i> <i>The structure of a quadratic function in vertex form reveals the vertex and axis of symmetry of the graph it represents.</i> <i>The standard form of a quadratic function is $f(x) = ax^2 + bx + c$, where c is the y-coordinate of the y-intercept and the axis of symmetry is the line $x = -b/(2a)$.</i> <i>A quadratic function can be used to model area and vertical motion problems. These models can be written in the same form as the quadratic function $f(x) = ax^2 + bx + c$ using key features to interpret and understand the situation.</i> <i>Linear, quadratic, and exponential functions are differentiated by their average rates of change over different intervals.</i> <i>A linear function models a relationship between x and y in which the differences between successive y-values are constant.</i> <i>A quadratic function models a relationship in which the second differences, or the difference between the first differences, are constant.</i> <i>An exponential function models a relationship where the ratios of consecutive y-values are constant.</i>
Benchmark Assessments	Alternative Assessments

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- District-assigned Benchmark Assessments (e.g. LinkIt, literacy screeners, content-specific benchmarks)

- Alternative Choice Projects
- Oral Assessments

Differentiation			
Special Education	MLL	At Risk	Gifted and Talented
• Modify and accommodate as listed in student IEP or 504 plan. • Utilize wait time effectively. • Communicate clear, concise directions and repeat, reword, modify as necessary. • Use visual aids during lessons and small-group time. • Utilize open-ended questioning techniques. • Utilize extended time and/or reduce number of items given for homework, quizzes, and tests. • Vary formative assessment styles to drive next point of instruction. • Create modified assessments. • Allow students to utilize online audio books, when appropriate. • Allow for collaboration through strategically selected groups. • Utilize assistive technology as appropriate. • Utilize graphic organizers. • Provide and model sentence	• Basic Skills Instruction • Speech/Language Therapy • Rosetta Stone • Provide English/Native Language Dictionary for use. • Place with native-language-speaking teacher/paraprofessional as available. • Use target words and cognates to understand texts. • Remind students to underline passages and list words they don't understand. • Learn/Utilize/Display some words in the students' native language. • Provide and model sentence frames to help students participate in discussion. • Provide word banks to help students write. • Translate printed communications in native language for parents. • Hold conferences with translator present.	• Basic Skills Instruction • Provide after-school tutoring services. • Hold fall and spring parent conferences. • Make modifications to instructional plans based on I and RS Plan. • Utilize wait time effectively. • Develop a record system to encourage good behavior and completion of work. • Utilize scaffolding to support instruction. • Provide counseling if necessary to help students cope with challenges. • Utilize strategic grouping with a positive academic role model. • Utilize graphic organizers.	• Promote self-initiated and self-directed learning for growth through independent projects. • Challenge students with age-appropriate texts at higher reading levels. • Allow for the development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. • Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture.

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frames/sentence starters. - Utilize manipulatives as necessary. - Provide breaks to allow for refocusing as necessary.			
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Quinton Township School District
Math
Grade 8 Algebra

Marking Period:	4	Unit Title:	Topic 9: Solving Quadratic Equations	Pacing:	20 Days
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Unit Summary: In Topic 9, students will extend knowledge of quadratic functions. Students learn to solve quadratic equations using tables, graphs, and factoring. Students also solve quadratic equations using square roots, completing the square, and the quadratic formula. Students learn different methods, such as graphing, elimination, and substitution, for solving linear-quadratic systems.

Objectives:

- Use a graph to identify the x-intercepts as solutions of a quadratic equation.
- Use a graphing calculator to make a table of values to approximate or solve a quadratic equation.

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- Use the Zero-Product Property and factoring to find the solutions of a quadratic equation.
- Apply factoring to solve real-world problems.
- Use the zeros of a quadratic equation to sketch a graph.
- Write the factored form of a quadratic function from a graph.
- Use properties of exponents to rewrite radical expressions.
- Multiply radical expressions.
- Write a radical expression to model or represent a real-world problem.
- Solve quadratic equations by finding square roots.
- Determine reasonable solutions for real-world problems.
- Solve a quadratic trinomial by completing the square to transform a quadratic equation into a perfect square trinomial.
- Use completing the square to write a quadratic equation in vertex form.
- Derive the quadratic formula by completing the square.
- Solve quadratic equations in one variable by using the quadratic formula.
- Use the discriminant to determine the number and type of solutions to a quadratic equation.
- Use mathematical modeling to represent a problem situation.
- Test and verify the appropriateness of their math models.
- Explain why the results might not exactly match the problem situation.
- Describe a linear-quadratic system of equations.
- Solve a linear-quadratic system of equations by graphing, elimination, or substitution.

Essential Questions:

- How can graphs and tables help you solve quadratic equations?
- How does factoring help you solve quadratic equations?
- How does rewriting radicals in different forms help you communicate your answers?
- How can square roots be used to solve quadratic equations?
- How is the technique of completing the square helpful for analyzing quadratic functions?
- When should you use the quadratic formula to solve equations?

- How is solving linear-quadratic systems of equations similar to and different from solving systems of linear equations?

New Jersey Student Learning Standards

Mathematics Learning Targets: HSA.REI.B.4.B, HSA.SSE.B.3.A, HSA.APR.B.3, HSF.IF.C.8.A, HSA.CED.A.1, HSA.SSE.B.3.B, HSA.REI.B.4.A, HSN.Q.A.3, HSA.SSE.B.3, HSA.REI.C.7, HSA.REI.D.11, HSF.IF.C.7.C

Mathematics Practices: MP1, MP.3, MP.5, MP.7

Interdisciplinary Connections: RI.CR.8.1

Career Readiness, Life Literacies, and Key Skills: 9.1.8.FP.5

Computer Science and Design Thinking: 9.4.8.TL.3, 9.4.8.IML.3, 8.1.8.DA.1

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
9.1 - Solving Quadratic Equations using Graphs and Tables 9.2 - Solving Quadratic Equations by Factoring 9.3 - Solving Quadratic Equations Using Square Roots 9.4 - Completing the Square 9.5 - The Quadratic Formula and the Discriminant	<i>enVision</i> Mathematics *Daily Review *Reteach to Build Understanding *Build Mathematical Literacy *Enrichment * <i>enVision</i> Stem Activity *Problem Solving Leveled-Reading Mat	Student Textbook Additional Practice Workbook Notebook Pen/Pencil Index Cards	• Smart Board Applications • Google Applications • Interactive student edition • Today's Challenge • Adaptive Practice • Desmos • IXL

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9.6 - Solving Systems of Linear and Quadratic Equations	*Problem-Solving Reading Activity *Digital Math Tools Activities *Language Support Handguide *Listen and Look For *Home-School Connection	TI-84 graphing calculators	
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Assessments	
Formative Assessments ● Topic Performance Task ● Oral questioning ● Using questioning strategies in TE ● Reteach for Understanding ● Classwork & Basic Skill Practice ● Corrections & Reflections ● Kahoot! ● Quizizz ● Desmos ● Rubric-for projects ● Self-reflection ● Adaptive practice- on-line Savvas resources ● Exit Slip ● HW	Summative Assessments ● Topic 9 Performance Task/Assessment ● Lesson Quizzes Suggested skills to be assessed: <i>A quadratic equation is an equation of the second degree. It can have 0, 1, or 2 solutions. The x-intercepts of a graph and the zeros in a table can be used to identify the real solutions.</i> <i>In the standard form of a quadratic equation $ax^2 + bx + c = 0$, where $a \neq 0$, the factors of the equation determine the solutions. Properties of exponents are used to rewrite radical expressions in different forms.</i> <i>A radical expression is written in the simplest form when there are no perfect square factors other than 1 in the radicand.</i> <i>When a quadratic equation is in the form $ax^2 + bx + c$, it can be solved by isolating the ax^2 term, simplifying to remove the coefficients, and then taking the square root of each side of the equation.</i>

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	<i>To complete the square, add the square of half of the coefficient of x to each side of the equation.</i> <i>Completing the square is useful when solving quadratic equations that are not factorable.</i> <i>The quadratic formula can be used to solve every quadratic equation and is particularly useful for those that cannot be easily factored.</i> <i>The discriminant of the quadratic formula indicates the number of solutions of the equation.</i> <i>For any system of two equations in two variables, the solution consists of the ordered pairs that satisfy both equations.</i>
Benchmark Assessments District-assigned Benchmark Assessments (e.g. LinkIt, literacy screeners, content-specific benchmarks)	Alternative Assessments - Alternative Choice Projects - Oral Assessments

Differentiation			
Special Education	MLL	At Risk	Gifted and Talented
Modify and accommodate as listed in student IEP or 504 plan.	- Basic Skills Instruction - Speech/Language Therapy - Rosetta Stone	- Basic Skills Instruction - Provide after-school tutoring services.	Promote self-initiated and self-directed learning for growth through independent

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• Utilize wait time effectively. • Communicate clear, concise directions and repeat, reword, modify as necessary. • Use visual aids during lessons and small-group time. • Utilize open-ended questioning techniques. • Utilize extended time and/or reduce number of items given for homework, quizzes, and tests. • Vary formative assessment styles to drive next point of instruction. • Create modified assessments. • Allow students to utilize online audio books, when appropriate. • Allow for collaboration through strategically selected groups. • Utilize assistive technology as appropriate. • Utilize graphic organizers. • Provide and model sentence frames/sentence starters. • Utilize manipulatives as necessary. • Provide breaks to allow for refocusing as necessary.	• Provide English/Native Language Dictionary for use. • Place with native-language-speaking teacher/paraprofessional as available. • Use target words and cognates to understand texts. • Remind students to underline passages and list words they don't understand. • Learn/Utilize/Display some words in the students' native language. • Provide and model sentence frames to help students participate in discussion. • Provide word banks to help students write. • Translate printed communications in native language for parents. • Hold conferences with translator present.	• Hold fall and spring parent conferences. • Make modifications to instructional plans based on I and RS Plan. • Utilize wait time effectively. • Develop a record system to encourage good behavior and completion of work. • Utilize scaffolding to support instruction. • Provide counseling if necessary to help students cope with challenges. • Utilize strategic grouping with a positive academic role model. • Utilize graphic organizers.	• projects. • Challenge students with age-appropriate texts at higher reading levels. • Allow for the development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. • Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture.
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Quinton Township School District
Math
Grade 8 Algebra

Marking Period:	4	Unit Title:	Topic 10: Working	Pacing:	15 Days
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Unit Summary: Topic 10 extends students' knowledge of functions to include radical functions. Students identify the key features of the graphs of radical functions. They also learn to transform functions, combine functions, and find inverse functions.

Objectives:

- Graph translations of the square root function.
- Calculate and interpret the average rate of change for a square root function over a specified interval.
- Identify key features of the graph of cube root functions and graph translations of them.
- Model real-world situations using the cube root functions.
- Calculate and interpret the average rate of change of a cube root function over a specified interval.
- Relate domain and range of a function to its graph.
- Analyze the key features of the graph of a function to identify the type of function it represents.
- Graph translations of absolute value, exponential, quadratic, and radical functions.
- Determine how combining translations affects the key features of the graph of a function.
- Identify the effect on the graph of a function of multiplying the output by -1.
- Identify the effect on the graph of a function of replacing $f(x)$ by $kf(x)$ or $f(kx)$ for specific values of k .
- Use mathematical modeling to represent a problem situation and to propose a solution.
- Test and verify the appropriateness of their math models.
- Explain why the results from their mathematical models might not align exactly with the problem situation.
- Combine functions using arithmetic operations, including addition, subtraction, and multiplication.
- Combine functions to solve real-world problems.
- Write an equation for the inverse of a linear function.
- Write the inverse of a quadratic function after restricting the domain so the original function is one-to-one.

Essential Questions:

- What key features are shared among the square root function and translations of the square function?
- What are the key features of the cube root function?
- What can you learn about a function by analyzing its graph?
- Do horizontal and vertical translations work in the same way for all types of functions?
- What change to a function will result in a vertical or horizontal stretch or compression of its graph?
- How can you extend addition, subtraction, and multiplication from numbers to functions?
- How can you use inverse functions to help solve problems?

New Jersey Student Learning Standards

Mathematics Learning Targets: HSF.BF.A.1.B, HSF.BF.B.3, HSF.IF.B.4, HSF.BF.B.4.A, HSF.IF.B.5, HSF.IF.B.6, HSF.IF.C.7.B

Mathematics Practices: MP.1, MP.5, MP.6, MP.7, MP.8

Interdisciplinary Connections: RI.CR.8.1

Career Readiness, Life Literacies, and Key Skills: 9.1.8.FP.5

Computer Science and Design Thinking: 9.4.8.TL.3, 9.4.8.IML.3, 8.1.8.DA.1

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
10.1 - The Square Root Function 10.2 - The Cube Root Function	<i>enVision</i> Mathematics *Daily Review *Reteach to Build	Student Textbook Additional Practice Workbook	• Smart Board Applications • Google Applications

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10.3 - Analyzing Functions Graphically 10.4 - Translations of Functions 10.5 - Compressions and Stretches of Functions	Understanding *Build Mathematical Literacy *Enrichment * <i>enVision</i> Stem Activity *Problem Solving Leveled-Reading Mat *Problem-Solving Reading Activity *Digital Math Tools Activities *Language Support Handguide *Listen and Look For *Home-School Connection	Notebook Pen/Pencil Index Cards TI-84 graphing calculators	● Interactive student edition ● Today's Challenge ● Adaptive Practice ● Desmos ● IXL
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Assessments	
Formative Assessments ● Topic Performance Task ● Oral questioning ● Using questioning strategies in TE ● Reteach for Understanding ● Classwork & Basic Skill Practice ● Corrections & Reflections ● Kahoot! ● Quizizz ● Desmos ● Rubric-for projects	Summative Assessments ● Topic 10 Performance Task/Assessment ● Lesson Quizzes Suggested skills to be assessed: <i>A square root function contains a square root symbol with the independent variable in the radicand.</i> <i>The general form of a cube root function is $f(x) = \sqrt[3]{x}$. It intersects both axes at the origin, and the domain and range are all real numbers.</i>

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● Self-reflection ● Adaptive practice- on-line Savvas resources ● Exit Slip ● HW	<i>The key features of the graphs of functions - including the domain, range, maximum, and minimum values, axis of symmetry, and end behavior - are used to identify and compare functions.</i> <i>Changes to the input and output of a function in the form $f(x - h) + k$ result in a translation of the graph of the function. Adding a constant k to the output of the function shifts the graph vertically. Subtracting a constant h from the input of the function shifts the graph horizontally.</i> <i>The graphs of functions are transformed when the input and output are multiplied by varying factors of k.</i> <i>Multiplying the output by a factor of k stretches or compresses the graph vertically.</i> <i>Multiplying the input by a factor of k stretches or compresses the graph horizontally.</i> <i>Functions can be combined in the same way as numbers, expressions, and polynomials. Addition, subtraction, and multiplication can be used to find $(f + g)(x)$, $(f - g)(x)$, and $(f \cdot g)(x)$.</i> <i>A one-to-one function is a function for which each range value corresponds to exactly one domain value.</i>
Benchmark Assessments ● District-assigned Benchmark Assessments (e.g. LinkIt, literacy screeners, content-specific benchmarks)	Alternative Assessments ● Alternative Choice Projects ● Oral Assessments

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Differentiation			
Special Education	MLL	At Risk	Gifted and Talented
• Modify and accommodate as listed in student IEP or 504 plan. • Utilize wait time effectively. • Communicate clear, concise directions and repeat, reword, modify as necessary. • Use visual aids during lessons and small-group time. • Utilize open-ended questioning techniques. • Utilize extended time and/or reduce number of items given for homework, quizzes, and tests. • Vary formative assessment styles to drive next point of instruction. • Create modified assessments. • Allow students to utilize online audio books, when appropriate. • Allow for collaboration through strategically selected groups. • Utilize assistive technology as appropriate. • Utilize graphic organizers. • Provide and model sentence frames/sentence starters. • Utilize manipulatives as necessary. • Provide breaks to allow for	• Basic Skills Instruction • Speech/Language Therapy • Rosetta Stone • Provide English/Native Language Dictionary for use. • Place with native-language-speaking teacher/paraprofessional as available. • Use target words and cognates to understand texts. • Remind students to underline passages and list words they don't understand. • Learn/Utilize/Display some words in the students' native language. • Provide and model sentence frames to help students participate in discussion. • Provide word banks to help students write. • Translate printed communications in native language for parents. • Hold conferences with translator present.	• Basic Skills Instruction • Provide after-school tutoring services. • Hold fall and spring parent conferences. • Make modifications to instructional plans based on I and RS Plan. • Utilize wait time effectively. • Develop a record system to encourage good behavior and completion of work. • Utilize scaffolding to support instruction. • Provide counseling if necessary to help students cope with challenges. • Utilize strategic grouping with a positive academic role model. • Utilize graphic organizers.	• Promote self-initiated and self-directed learning for growth through independent projects. • Challenge students with age-appropriate texts at higher reading levels. • Allow for the development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. • Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture.

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refocusing as necessary.			
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Quinton Township School District
Math
Grade 8 Algebra

Marking Period:	4	Unit Title:	Topic 11: Statistics	Pacing:	15 Days
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Unit Summary: In Topic 11, students will extend their knowledge of dot plots, and histograms. Students identify that standard deviation is used to compare a specific value to other values. Students understand how to find joint, marginal, and relative frequencies. Students learn methods to interpret data displays and create inferences based on the data.

Objectives:

- Represent data using dot plots, box plots, and histograms.
- Interpret the data displayed in dot plots, box plots, and histograms within the context of the data that it represents.
- Use measures of center to interpret and compare data sets displayed in dot plots, box plots, and histograms.
- Explain and account for the effect of outliers on measures of center and variability.
- Use measures of variability, such as the MAD and IQR, to interpret and compare data sets.
- Interpret and compare differences in the shape, center, and spread of data of different data sets.
- Determine the relationship between the mean and median of a data set when the shape of the data is evenly spread, skewed right, or skewed left.
- Interpret the differences in the variability or spread in the context of a data set.
- Calculate the standard deviation of a data set and use it to compare and interpret data sets.

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- Organize and summarize categorical data by creating two-way frequency tables.
- Calculate and interpret joint and marginal frequencies, joint and marginal relative frequencies, and conditional relative frequencies, and use them to make inferences about a population.
- Use mathematical modeling to represent a problem situation and to propose a solution.
- Test and verify the appropriateness of the math model.
- Explain why the results from the mathematical model might not align exactly with the problem situation.

Essential Questions:

- What information about data sets can you get from different data displays?
- How can you use the measures of center and spread to compare data sets?
- How does the shape of a data set help you understand the data?
- Why does the way in which data are spread out matter?
- How can you use two-way frequency tables to analyze data?

New Jersey Student Learning Standards

Mathematics Learning Targets: HSS.ID.A.1, HSS.ID.A.2, HSS.ID.A.3, HSS.ID.B.5

Mathematics Practices: MP.2, MP.3, MP.6, MP.7

Interdisciplinary Connections: SL.PE.8.1

Career Readiness, Life Literacies, and Key Skills: 9.1.8.FP.5

Computer Science and Design Thinking: 9.4.8.TL.3, 8.1.8.DA.1

Overview of Activities	Teacher's Guide/ Resources	Core Instructional Materials	Technology Infusion
11.1 - Analyzing Data Displays 11.2 - Comparing Data Sets 11.3 - Interpreting the Shapes of Data Displays 11.4 - Standard Deviation 11.5 - Two-way Frequency Tables	<i>enVision</i> Mathematics *Daily Review *Reteach to Build Understanding *Build Mathematical Literacy *Enrichment * <i>enVision</i> Stem Activity *Problem Solving Leveled-Reading Mat *Problem-Solving Reading Activity *Digital Math Tools Activities *Language Support Handguide *Listen and Look For *Home-School Connection	Student Textbook Additional Practice Workbook Notebook Pen/Pencil Index Cards TI-84 graphing calculators	● Smart Board Applications ● Google Applications ● Interactive student edition ● Today's Challenge ● Adaptive Practice ● Desmos ● IXL

Assessments	
Formative Assessments ● Topic Performance Task ● Oral questioning ● Using questioning strategies in TE ● Reteach for Understanding ● Classwork & Basic Skill Practice	Summative Assessments ● Topic 11 Performance Task/Assessment ● NJSLA Practice Assessments and warm-ups ● NJSLA Assessment ● Water Park Project

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● Corrections & Reflections ● Kahoot! ● Quizizz ● Desmos ● Rubric-for projects ● Self-reflection ● Adaptive practice- on-line Savvas resources ● Exit Slip ● HW	Suggested skills to be assessed: <i>Dot plots, histograms, and box plots provide different information about the data sets they represent.</i> <i>Dot plots show the frequency of data and clearly show clusters, gaps, and outliers.</i> <i>Histograms show the distribution of values within a data set and shape of the data.</i> <i>Box plots show the center and spread of a distribution.</i> <i>Measures of center and variability are used to compare data sets displayed in dot plots, box plots, and histograms.</i> <i>Dot plots show how much the data vary.</i> <i>Box plots show the minimum, maximum, and center of the data.</i> <i>Histograms show ranges of data.</i> <i>When the shape of the data display is symmetric, the mean is equal (or approximately equal) to the median. When the shape of the data display is skewed right or skewed left, the mean and median are not equal.</i> <i>Standard deviation is a measure of spread, or variability. It indicates by how much the values in a data set deviate from the mean.</i> <i>Two-way frequency tables show relationships between two sets of categorical data.</i>
Benchmark Assessments ● District-assigned Benchmark Assessments (e.g. LinkIt, literacy screeners, content-specific benchmarks)	Alternative Assessments ● Alternative Choice Projects ● Oral Assessments

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Differentiation			
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• Modify and accommodate as listed in student IEP or 504 plan. • Utilize wait time effectively. • Communicate clear, concise directions and repeat, reword, modify as necessary. • Use visual aids during lessons and small-group time. • Utilize open-ended questioning techniques. • Utilize extended time and/or reduce number of items given for homework, quizzes, and tests. • Vary formative assessment styles to drive next point of instruction. • Create modified assessments. • Allow students to utilize online audio books, when appropriate. • Allow for collaboration through strategically selected groups. • Utilize assistive technology as appropriate. • Utilize graphic organizers. • Provide and model sentence frames/sentence starters. • Utilize manipulatives as necessary. • Provide breaks to allow for	• Basic Skills Instruction • Speech/Language Therapy • Rosetta Stone • Provide English/Native Language Dictionary for use. • Place with native-language-speaking teacher/paraprofessional as available. • Use target words and cognates to understand texts. • Remind students to underline passages and list words they don't understand. • Learn/Utilize/Display some words in the students' native language. • Provide and model sentence frames to help students participate in discussion. • Provide word banks to help students write. • Translate printed communications in native language for parents. • Hold conferences with translator present.	• Basic Skills Instruction • Provide after-school tutoring services. • Hold fall and spring parent conferences. • Make modifications to instructional plans based on I and RS Plan. • Utilize wait time effectively. • Develop a record system to encourage good behavior and completion of work. • Utilize scaffolding to support instruction. • Provide counseling if necessary to help students cope with challenges. • Utilize strategic grouping with a positive academic role model. • Utilize graphic organizers.	• Promote self-initiated and self-directed learning for growth through independent projects. • Challenge students with age-appropriate texts at higher reading levels. • Allow for the development and application of productive thinking skills to enable students to re-conceptualize existing knowledge and/or generate new knowledge. • Provide for the development of self-understanding of one's relationships with people, societal institutions, nature and culture.

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