

BENWAY SCHOOL

Algebra Curriculum

Grade 8



Benway School

Unit 1

Content Area: Algebra 1

Unit Title: Modeling with Linear Equations and Inequalities

Grade Level: 8

Unit Overview: Students will reason quantitatively and use units to solve problems, solve linear equations and inequalities in one variable, understand solving equations as a process of reasoning and explain the reasoning, and create equations that describe numbers or relationships. They will also interpret the structure of expressions, represent and solve equations graphically, and summarize, represent, and interpret data on quantitative variables. These skills will be mastered through differentiated activities, cross-curricular lessons, multiple means of assessment and the enhancement of prior skills and knowledge.

Recommended Pacing: 8-10 weeks (September-November)

Student Learning Objectives

NJSLS

Major Content **Supporting Content** **Additional Content** (Identified by PARCC Model Content Frameworks).

***Bold type indicates benchmarked standard.** (Identified by PARCC Model Content Frameworks).*

Solve multi-step problems, using units to guide the solution, interpreting units consistently in formulas and choosing an appropriate level of accuracy on measurement quantities. Develop descriptive models by defining appropriate quantities. (SMP 1, 2, 4, 5)

N.Q.A.1-3

Solve linear equations and inequalities in one variable (including literal equations); justify each step in the process. (SMP 2, 6, 7)

A.REI.B.3
A.REI.A.1
A.CED.A.4

Interpret terms, factors, coefficients, and other parts of expressions in terms of a context. (SMP 1, 2)

A.SSE.A.1a

Create linear equations and inequalities in one variable and use them in contextual situations to solve problems. Justify each step in the process and the solution. (SMP 2, 4, 7)

A.CED.A.1
A.REI.A.1

Create linear equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (SMP 2, 4, 7)

A.CED.A.2
N.Q.A.1.
A.REI.D.10

Represent data on a scatter plot, describe how the variables are related and use technology to fit function to data. (SMP 1, 2, 4, 5, 6)

S.ID.B.6

Interpret the slope, intercept, and correlation coefficient of a data set of a linear model; distinguish between correlation and causation. (SMP 1, 2, 4, 5, 6)	S.ID.C.7-9
Explain why the solutions of the equation $f(x) = g(x)$ are the x-coordinates of the points where the graphs of the linear equations $y=f(x)$ and $y=g(x)$ intersect. (SMP 1, 3, 5)	A.REI.D.11
Find approximate solutions of $f(x) = g(x)$, where $f(x)$ and $g(x)$ are linear functions, by making a table of values, using technology to graph and finding successive approximations. (SMP 1, 3, 5)	A.REI.D.11
New Jersey Student Learning Standards Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks). <i>Bold type indicates benchmarked standard. (Identified by PARCC Model Content Frameworks).</i>	Progress Indicator
Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	N.Q.A.1
Define appropriate quantities for the purpose of descriptive modeling.	N.Q.A.2
Choose a level of accuracy appropriate to limitations on measurement when reporting quantities	N.Q.A.3
Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	A.REI.B.3
Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	A.REI.A.1
Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. <i>For example, rearrange Ohm's law $V = IR$ to highlight resistance R.</i>	A.CED.A.4
Interpret expressions that represent a quantity in terms of its context.* a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P</i>	A.SSE.A.1
Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.</i>	A.CED.A.1
Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	A.REI.A.1
Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	A.CED.A.2

Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	A.REI.D.10
Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	S.ID.B.6
Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	S.ID.C.7
Compute (using technology) and interpret the correlation coefficient of a linear fit.	S.ID.C.8
Distinguish between correlation and causation.	S.ID.C.9
Explain why the x -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.	A.REI.D.11
Standards for Mathematical Practice	Progress Indicator
Make sense of problems and persevere in solving them.	SMP1
Reason abstractly and quantitatively.	SMP2
Construct viable arguments & critique the reasoning of others.	SMP3
Model with mathematics.	SMP4
Use appropriate tools strategically.	SMP5
Attend to precision.	SMP6
Look for and make use of structure.	SMP7
New Jersey Student Learning Standards Technology <i>(Additional standards should be applied, as needed, to enrich instruction and foster student achievement.)</i>	Indicator
Demonstrate knowledge of a real world problem using digital tools.	8.1.8.A.1
Graph and calculate data within a spreadsheet and present a summary of the results.	8.1.8.A.4
Create a database query, sort and create a report and describe the process, and explain the report results.	8.1.8.A.5
Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.	8.2.8.E.3
Use appropriate terms in conversation (e.g., programming, language, data, RAM, ROM, Boolean logic terms).	8.2.8.E.4
New Jersey Student Learning Standards	Indicator

21st Century Life and Career Skills <i>(Additional standards should be applied, as needed, to enrich instruction and foster student achievement.)</i>	
Explain the purpose of the payroll deduction process, taxable income, and employee benefits.	9.1.8.A.7
Distinguish among cash, check, credit card, and debit card.	9.1.8.B.1
Construct a simple personal savings and spending plan based on various sources of income.	9.1.8.B.2
Justify the concept of “paying yourself first” as a financial savings strategy.	9.1.8.B.3
Relate the concept of deferred gratification to [investment,] meeting financial goals, and building wealth.	9.1.8.B.4
Develop a system for keeping and using financial records.	9.1.8.B.8
Determine the most appropriate use of various financial products and services (e.g., ATM, debit cards, credit cards, check books).	9.1.8.B.9
Justify safeguarding personal information when using credit cards, banking electronically, or filing forms.	9.1.8.B.10
Determine how saving contributes to financial well-being.	9.1.8.D.1
Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards.	9.1.8.E.5
Career Ready Practices	Indicator
Apply appropriate academic and technical skills.	CRP2
Communicate clearly and effectively and with reason.	CRP4
Demonstrate creativity and innovation.	CRP6
Utilize critical thinking to make sense of problems and persevere in solving them.	CRP8
Use technology to enhance productivity.	CRP11
Work productively in teams while using cultural global competence.	CRP12
Key Vocabulary Words	
<ul style="list-style-type: none"> ● Equations ● Variable ● Factors ● Term ● Coefficient ● Linear equations ● Standard form ● Slope intercept form ● Point slope form ● Constant ● Root ● Rate of change ● Slope ● Direct variation ● Scatter plot ● Line of fit 	

- Causation
- Correlation
- System of equations

Evidence of Learning

Additional Suggested Assessments:

- Presentations
- Class discussions
- Homework
- Tests/quizzes
- Discussions
- Peer evaluations
- Daily oral language
- Chapter Reading
- Outline/Notes
- Vocabulary Assessments/ Application of Vocabulary
- Exams
- Projects

Learning Activities:

- Differentiated Instructional Groups and Activities
- Small group/ large group discussion
- Exploration of key concepts
- Anchor Activities

Instructional Materials:

Primary:

- Edmodo
- Smartboards
- Internet
- <https://connected.mcgraw-hill.com>

Secondary:

- Supplemental Readings/ Articles based on student interest/discussion
- <http://www.mathgiraffe.com/blog/relevant-math-articles-to-share-with-teens>
- <https://www.nytimes.com/topic/subject/mathematics>

Teacher Resources:

[N.Q.A.1 Runners' World](#)

[N.Q.A.2 Giving Raises](#)

[N.Q.A.3 Calories in a Sports Drink](#)

[A.REI.B.3, A.REI.A.1 Reasoning with linear inequalities](#)

[A.CED.A.4 Equations and Formulas](#)

[A.SSE.A.1 Kitchen Floor Tiles](#)

A.CED.A.1 Planes and wheat

A-CED.A.1 Paying the rent

A.REI.A.1 Zero Product Property 1

A.CED.A.2 Clear on an Escalator

S.ID.B.6,S.ID.C.7-9 Coffee and Crime

Modifications & Accommodations:

**Please note that the following modifications and accommodations vary from unit to unit, and may be implemented for any student who would benefit*

Gifted and Talented

(content, process, product, and learning environment)

Extension Activities:

- Conduct research and provide presentation of cultural topics
- Design surveys to generate and analyze data to be used in discussion.
Debate topics of interest/cultural importance.
- Authentic listening and reading sources that provide data and support for speaking and writing prompts
- Exploration of art and/or artists to understand society and history
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication
- Anchor activities
- Use of higher-level questioning techniques
- Provide assessments at a higher-level of thinking

English Language Learners

Modifications:

- Modified assignments
- Native language translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed
- Highlight key vocabulary
- Use graphic organizers

Students with Disabilities

(appropriate accommodations, instructional adaptation, and/or modifications as determined by the IEP or 504 team)

Modifications for Classroom:

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments,
- Repetition and practice
- Model skills/techniques to be mastered
- Extended time to complete class work

Students at Risk of School Failure

Modifications for Classroom:

- Pair visual prompts with verbal presentations
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- Provide a copy of class notes
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- Student may request to use a computer to complete assignments
- Establish expectations for correct spelling on assignments
- Extra textbooks for home
- Student may request books on tape/CD/digital media, as available and appropriate
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short-term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments:

- Extended time to complete assignments
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication

Modifications for Assessments:

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments

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Benway School

Unit 2

Content Area: Algebra 1

Unit Title: Modeling with Linear Functions, Linear Systems & Exponential Functions

Grade Level: 8

Unit Overview: Students will solve linear systems of equations, create equations that describe numbers or relationships, interpret the structure of expressions, and represent and solve equations and inequalities graphically. They will also construct & compare linear & exponential models, interpret expressions for functions in terms of the situation, build a function that models a relationship between two quantities, understand the concept of a function and use function notation, interpret functions that arise in applications in terms of the context, and analyze functions using different representations. These skills will be mastered through differentiated activities, cross-curricular lessons, multiple means of assessment and the enhancement of prior skills and knowledge.

Recommended Pacing: 8-10 weeks (November-January)

<p align="center">Student Learning Objectives</p> <p>Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks). <i>Bold type indicates benchmarked standard. Identified by PARCC Model Content Frameworks).</i></p>	<p align="center">NJSLS</p>
Solve multistep contextual problems by identifying variables, writing equations, and solving systems of linear equations in two variables algebraically and graphically. (SMP 1, 2, 3, 4)	<p align="center">AREI.C.6 A.CED.A.3 A.REI.C.5</p>
Graph linear inequalities and systems of linear inequalities in two variables and explain that the solution to the system. (SMP 1, 2, 4, 5, 6)	<p align="center">A.REI.D.12 A.CED.A.3</p>
Explain the definition of a function, including the relationship between the domain and range. Use function notation, evaluate functions and interpret statements in context. (SMP 2, 6, 7)	<p align="center">F.IF.A.1 F.IF.A.2</p>
Distinguish between and explain situations modeled with linear functions and with exponential functions. (SMP 3, 6)	<p align="center">F.LE.A.1a-b</p>
Write linear and exponential functions given a graph, table of values, or written description; construct arithmetic and geometric sequences. (SMP 1, 2, 4, 5, 6, 7)	<p align="center">F.LE.A.2 F.IF.A.3</p>
Write explicit expressions, recursive processes and steps for calculation from a context that describes a linear or exponential relationship between two quantities. (SMP 2, 4)	<p align="center">F.BF.A.1 A.SSE.A.1a-b</p>
Use properties of exponents to produce equivalent forms of exponential expressions in one variable. (SMP 1, 2, 4, 7)	<p align="center">A.SSE.B.3.c</p>
Sketch graphs of linear and exponential functions expressed symbolically or from a verbal description. Show key features and interpret parameters in context. (SMP 2, 4, 6)	<p align="center">F.IF.B.4 F.LE.B.5 F.IF.B.5</p>

Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). (SMP 1, 3, 5, 6, 8)	F.IF.C.9
Calculate and interpret the average rate of change of a function presented symbolically or as a table; estimate the rate of change from a graph. (SMP 1, 3, 5, 6, 8)	F.IF.B.6
Graph linear, square root, cube root, and piecewise-defined functions (including step and absolute value functions) expressed symbolically. Graph by hand in simple cases and using technology in more complex cases, showing key features of the graph. (SMP 1, 5, 6)	F.IF.C.7a-b
New Jersey Student Learning Standards Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks). <i>Bold type indicates benchmarked standard. (Identified by PARCC Model Content Frameworks).</i>	Progress Indicator
Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	A.REI.C.6
Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. <i>For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</i>	A.CED.A.3
Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	A.REI.C.5
Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	A.REI.D.12
Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.	F.IF.A.1
Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	F.IF.A.2
Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	F.LE.A.1

Construct linear and exponential functions - including arithmetic and geometric sequences - given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	F.LE.A.2
Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. <i>For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.</i>	F.IF.A.3
Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context.	F.BF.A.1
Interpret expressions that represent a quantity in terms of its context a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</i>	A.SSE.A.1
Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. c. Use the properties of exponents to transform expressions for exponential functions. <i>For example, the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.</i>	A.SSE.B.3
For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i> *	F.IF.B.4
Interpret the parameters in a linear or exponential function in terms of a context.	F.LE.B.5
Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.</i>	F.IF.B.5
Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>ample, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i>	F.IF.C.9
Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	F.IF.B.6
Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima.	F.IF.C.7

b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	
Standards for Mathematical Practice	Progress Indicator
Make sense of problems and persevere in solving them.	SMP1
Reason abstractly and quantitatively.	SMP2
Construct viable arguments & critique the reasoning of others.	SMP3
Model with mathematics.	SMP4
Use appropriate tools strategically.	SMP5
Attend to precision.	SMP6
Look for and make use of structure.	SMP7
Look for and express regularity in repeated reasoning.	SMP8
New Jersey Student Learning Standards Technology	Indicator
Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.	8.1.12.A.3
Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.	8.1.12.C.1
Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.	8.1.12.D.1
Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.	8.1.12.D.2
Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.	8.1.12.F.1
Demonstrate how reusing a product affects the local and global environment.	8.2.2.B.2
Identify products or systems that are designed to meet human needs.	8.2.2.B.3
Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation and maintenance of a chosen product.	8.2.12.B.2
New Jersey Student Learning Standards 21st Century Life and Career Skills	Indicator
Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.	8.1.12.A.3
Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.	8.1.12.C.1

Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.	8.1.12.D.1
Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.	8.1.12.D.2
Career Ready Practices	
Apply appropriate academic and technical skills.	CRP2
Communicate clearly and effectively and with reason.	CRP4
Demonstrate creativity and innovation.	CRP6
Utilize critical thinking to make sense of problems and persevere in solving them.	CRP8
Use technology to enhance productivity.	CRP11
Work productively in teams while using cultural global competence.	CRP12
Key Vocabulary Words	
<ul style="list-style-type: none"> ● System of linear equations ● Domain ● Range ● Substitution method ● Elimination method ● System of inequalities ● Arithmetic sequences ● Maximum ● Minimum ● Symmetry ● Monomial ● Binomials ● Trinomials ● Polynomials ● Rational exponents ● Nth root ● Cube root ● Exponential functions ● Growth ● Decay 	
Evidence of Learning	
Additional Suggested Assessments:	
<ul style="list-style-type: none"> ● Presentations ● Class discussions ● Homework ● Tests/quizzes ● Discussions ● Peer evaluations ● Daily oral language ● Chapter Reading ● Outline/Notes 	

- Vocabulary Assessments/ Application of Vocabulary
- Exams
- Projects

Learning Activities:

- Differentiated Instructional Groups and Activities
- Small group/ large group discussion
- Exploration of key concepts
- Anchor Activities

Instructional Materials:

Primary:

- Edmodo
- Smartboards
- Internet
- <https://connected.mcgraw-hill.com>

Secondary:

- Supplemental Readings/ Articles based on student interest/discussion
- <http://www.mathgiraffe.com/blog/relevant-math-articles-to-share-with-teens>
- <https://www.nytimes.com/topic/subject/mathematics>

Teacher Resources:

[A.REI.C.6 Cash Box](#)

[A.CED.A.3 Dimes and Quarters](#)

[A.REI.C.5 Solving Two Equations in Two Unknowns](#)

[A.REI.D.12 Fishing Adventures 3](#)

[F.IF.A.1 The Parking Lot](#)

[F.IF.A.2 Yam in the Oven](#)

[F.LE.A.1 Finding Linear and Exponential Models](#)

[F.LE.A.2 Interesting Interest Rates](#)

[F.BF.A.1a Skeleton Tower](#)

[A.SSE.A.1 Mixing Candies](#)

[F.IF.B.4 Warming and Cooling](#)

[F.IF.B.4, F.IF.B.5 Average Cost](#)

[F.LE.B.5 US Population 1982-1988](#)

F.IF.B.6 Temperature Change

F.IF.C.7b Bank Account Balance

Modifications & Accommodations:

**Please note that the following modifications and accommodations vary from unit to unit, and may be implemented for any student who would benefit*

Gifted and Talented

(content, process, product, and learning environment)

Extension Activities:

- Conduct research and provide presentation of various topics
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Design surveys to generate and analyze data to be used in discussion.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication
- Anchor activities
- Use of higher-level questioning techniques
- Provide assessments at a higher-level of thinking

English Language Learners

Modifications:

- Modified assignments
- Native language translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed
- Highlight key vocabulary
- Use graphic organizers

Students with Disabilities

(appropriate accommodations, instructional adaptation, and/or modifications as determined by the IEP or 504 team)

Students at Risk of School Failure

Modifications for Classroom:

- Pair visual prompts with verbal presentations

Modifications for Classroom:

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments,
- Repetition and practice
- Model skills/techniques to be mastered
- Extended time to complete class work
- Provide copy of class notes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments
- Establish expectations for correct spelling on assignments
- Extra textbooks for home
- Student may request books on tape/CD/digital media, as available and appropriate
- Assign a peer helper in the class setting
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- Assist student with long and short-term planning of assignments
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- Provide regular parent/school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments:

- Extended time to complete assignments
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication

Modifications for Assessments:

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed

- Ask students to restate information, directions, and assignments
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
- Repetition and practice
- Model skills/techniques to be mastered
- Extended time to complete class work
- Provide a copy of class notes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments
- Establish expectations for correct spelling on assignments
- Extra textbooks for home
- Student may request books on tape/CD/digital media, as available and appropriate
- Assign a peer helper in the class setting

<ul style="list-style-type: none"> ● Restate, reread, and clarify directions/questions ● Distribute study guide for classroom tests ● Establish procedures for accommodations/modifications for assessments 	<ul style="list-style-type: none"> ● Provide oral reminders and check student work during independent work time ● Assist student with long and short-term planning of assignments ● Encourage student to proofread assignments and tests ● Provide regular parent/school communication ● Teachers will check/sign student agenda daily ● Student requires use of other assistive technology device <p>Modifications for Homework and Assignments:</p> <ul style="list-style-type: none"> ● Extended time to complete assignments ● Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases. ● Provide the student with clearly stated (written) expectations and grading criteria for assignments. ● Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication <p>Modifications for Assessments:</p> <ul style="list-style-type: none"> ● Extended time on classroom tests and quizzes ● Student may take/complete tests in an alternate setting as needed ● Restate, reread, and clarify directions/questions ● Distribute study guide for classroom tests ● Establish procedures for accommodations/modifications for assessments
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Benway School

Unit 3

Content Area: Algebra 1

Unit Title: Quadratic Equations, Functions, & Polynomials

Grade Level: 8

Unit Overview: Students will perform arithmetic operations on polynomials, understand the relationship between zeros and factors, interpret the structure of expressions, solve equations and inequalities in one variable, create equations that describe numbers or relationships, and interpret functions that arise in applications in terms of the context. They will also represent and solve equations and inequalities graphically, build a function that models a relationship between two quantities, construct & compare linear, quadratic, & exponential models, build new functions from existing functions, analyze functions using different representations, and use properties of rational and irrational numbers. These skills will be mastered through differentiated activities, cross-curricular lessons, multiple means of assessment and the enhancement of prior skills and knowledge.

Recommended Pacing: 8-10 weeks (February-April)

Student Learning Objectives	NJSLs
<p>Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks). <i>Bold type indicates benchmarked standard. (Identified by PARCC Model Content Frameworks).</i></p>	
Add, subtract, and multiply polynomials, relating these to arithmetic operations with integers. Factor to produce equivalent forms of quadratic expressions in one variable. (SMP 2, 7)	<p>A.APR.A.1 A.SSE.A.2</p>
Derive the quadratic formula by completing the square and recognize when there are no real solutions. (SMP 1, 3, 5, 7)	<p>A.REI.B.4.a</p>
Solve quadratic equations in one variable using a variety of methods (including inspection, taking square roots, factoring, completing the square, and the quadratic formula) and write complex solutions in $a \pm bi$ form. (SMP 1, 3, 5, 7)	<p>A.REI.B.4.b</p>
Create quadratic equations in one variable and use them to solve problems. (SMP 2, 6, 7)	<p>A.CED.A.1</p>
Interpret key features of quadratic functions from graphs and tables. Given a verbal description of the relationship, sketch the graph of a quadratic function, showing key features and relating the domain of the function to its graph. (SMP 2, 4)	<p>F.IF.B.4 F.IF.B.5</p>
Use factoring and completing the square to produce equivalent forms of quadratic expressions in one variable that highlight particular properties such as the zeros or the maximum or minimum value of the function. (SMP 1, 2, 4, 7)	<p>A.SSE.B.3a-b</p>
Given a context, write an explicit expression, a recursive process or steps for calculation for quadratic relationships. (SMP 2, 4)	<p>F.BF.A.1</p>
Graph quadratic functions by hand in simple cases and with technology in complex cases, showing intercepts, extreme values and symmetry of the graph.	<p>F.IF.C.7 F.IF.C.8 F.IF.C.9</p>

Compare properties of two quadratic functions, each represented in a different way. (SMP 1, 3, 5, 6, 8)	
Calculate and interpret the average rate of change of a quadratic function presented symbolically or as a table. Estimate and compare the rates of change from graphs of quadratic and exponential functions. (SMP 1, 4, 5, 7)	F.IF.B.6 F.LE.A.3
Identify the effects of transformations and combinations of transformations [$f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$] on a function; find the value of k given the graph. (SMP 3, 5, 7)	F.BF.B.3
Find approximate solutions of $f(x) = g(x)$, where $f(x)$ is a linear function and $g(x)$ is a quadratic function by making a table of values, using technology to graph and finding successive approximations. (SMP 1, 5)	A.REI.D.11
Identify zeros of cubic functions when suitable factorizations are available and use the zeros to construct a rough graph of the function. (*cubic functions are presented as the product of a linear and a quadratic factor) (SMP 7)	A.APR.B.3
Explain and justify conclusions about sums and products of rational and irrational numbers. (SMP 3, 6)	N.RN.B.3
New Jersey Student Learning Standards Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks). <i>Bold type indicates benchmarked standard. (Identified by PARCC Model Content Frameworks).</i>	Progress Indicator
Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	A.APR.A.1
Use the structure of an expression to identify ways to rewrite it. <i>For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.</i>	A.SSE.A.2
Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .	A.REI.B.4
Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear functions and quadratic functions, and simple rational and exponential functions.	A.CED.A.1
For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i>	F.IF.B.4

<p>Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.</p> <p><i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function</i></p>	F.IF.B.5
<p>Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.</p> <p>a. Factor a quadratic expression to reveal the zeros of the function it defines.</p> <p>b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.</p>	A.SSE.B.3
<p>Write a function that describes a relationship between two quantities.</p> <p>a. Determine an explicit expression, a recursive process, or steps for calculation from a context.</p>	F.BF.A.1
<p>Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.</p> <p>a. Graph linear and quadratic functions and show intercepts, maxima, and minima. *[emphasize quadratic functions]</p>	F.IF.C.7
<p>Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p> <p>a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.</p>	F.IF.C.8
<p>Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).</p> <p><i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i></p>	F.IF.C.9
<p>Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.</p>	F.IF.B.6
<p>Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.</p>	F.LE.A.3
<p>Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.</p>	F.BF.B.3
<p>Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$</p>	A.REI.D.11

and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*	
Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. *[Algebra 1: limit to quadratic and cubic functions in which linear and quadratic factors are available]	A.APR.B.3
Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	N.RN.B.3
Standards for Mathematical Practice	Progress Indicator
Make sense of problems and persevere in solving them.	SMP1
Reason abstractly and quantitatively.	SMP2
Construct viable arguments & critique the reasoning of others.	SMP3
Model with mathematics.	SMP4
Use appropriate tools strategically.	SMP5
Attend to precision.	SMP6
Look for and make use of structure.	SMP7
Look for and express regularity in repeated reasoning.	SMP8
New Jersey Student Learning Standards Technology	Indicator
Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.	8.1.12.A.3
Develop an innovative solution to a real-world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.	8.1.12.C.1
Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.	8.1.12.D.1
Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.	8.1.12.D.2
Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.	8.1.12.F.1
Demonstrate how reusing a product affects the local and global environment.	8.2.2.B.2
Identify products or systems that are designed to meet human needs.	8.2.2.B.3
Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation and maintenance of a chosen product.	8.2.12.B.2
New Jersey Student Learning Standards	Indicator

21st Century Life and Career Skills	
Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.	8.1.12.A.3
Develop an innovative solution to a real-world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.	8.1.12.C.1
Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.	8.1.12.D.1
Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.	8.1.12.D.2
Career Ready Practices	Indicator
Apply appropriate academic and technical skills.	CRP2
Communicate clearly and effectively and with reason.	CRP4
Demonstrate creativity and innovation.	CRP6
Utilize critical thinking to make sense of problems and persevere in solving them.	CRP8
Use technology to enhance productivity.	CRP11
Work productively in teams while using cultural global competence.	CRP12
Key Vocabulary Words	
<ul style="list-style-type: none"> ● Polynomial ● Binomial ● Trinomial ● Degree of a monomial ● Degree of a polynomial ● Standard form of a polynomial ● Leading coefficient ● Quadratic expression ● FOIL Method ● Factoring ● Completing the square ● Factoring by grouping ● Difference of two squares ● Parabola ● Vertex ● Symmetry ● Maximum ● Minimum ● Transformations 	
Evidence of Learning	
Additional Suggested Assessments: <ul style="list-style-type: none"> ● Presentations ● Class discussions ● Homework ● Tests/quizzes 	

- Discussions
- Peer evaluations
- Daily oral language
- Chapter Reading
- Outline/Notes
- Vocabulary Assessments/ Application of Vocabulary
- Exams
- Projects

Learning Activities:

- Differentiated Instructional Groups and Activities
- Small group/ large group discussion
- Exploration of key concepts
- Anchor Activities

Instructional Materials:

Primary:

- Edmodo
- Smartboards
- Internet
- <https://connected.mcgraw-hill.com>

Secondary:

- Supplemental Readings/ Articles based on student interest/discussion
- <http://www.mathgiraffe.com/blog/relevant-math-articles-to-share-with-teens>
- <https://www.nytimes.com/topic/subject/mathematics>

Teacher Resources:

[A.APR.A.1 Powers of 11](#)

[A.SSE.A.2 Equivalent Expressions](#)

[A.REI.B.4 Visualizing Completing the Square](#)

[A.REI.B.4 Braking Distance](#)

[A.REI.B.4 Two Squares are Equal](#)

[F.IF.B.4 Words – Tables - Graphs](#)

[F.IF.B.5 The restaurant](#)

[A.SSE.B.3 Profit of a company](#)

[A.SSE.B.3 Rewriting a Quadratic Expression](#)

[F.IF.C.7a Graphs of Quadratic Functions](#)

F.IF.C.8a Springboard Dive

F.IF.C.8a Which Function?

F.IF.B.9 Throwing Baseballs

F.IF.B.6 Mathemafish Population

F.LE.A.3 Population and Food Supply

F.BF.B.3 Identifying Even and Odd Functions

F.BF.B.3 Transforming the graph of a function

A.REI.D.11 Introduction to Polynomials – College Fund

A.APR.B.3 Graphing from Factors 1

N.RN.B.3 Operations with Rational and Irrational Numbers

Modifications & Accommodations:

**Please note that the following modifications and accommodations vary from unit to unit, and may be implemented for any student who would benefit*

Gifted and Talented

(content, process, product, and learning environment)

Extension Activities:

- Conduct research and provide presentation of various topics
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with

English Language Learners

Modifications:

- Modified assignments
- Native language translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed
- Highlight key vocabulary
- Use graphic organizers

<p>multiple entry points and multiple ways to demonstrate their understandings.</p> <ul style="list-style-type: none"> ● Design surveys to generate and analyze data to be used in discussion. ● Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication ● Anchor activities ● Use of higher-level questioning techniques ● Provide assessments at a higher-level of thinking 	
<p style="text-align: center;"><u>Students with Disabilities</u> <i>(appropriate accommodations, instructional adaptation, and/or modifications as determined by the IEP or 504 team)</i></p> <p>Modifications for Classroom:</p> <ul style="list-style-type: none"> ● Pair visual prompts with verbal presentations ● Ask students to restate information, directions, and assignments, ● Repetition and practice ● Model skills/techniques to be mastered ● Extended time to complete class work ● Provide copy of class notes ● Preferential seating to be mutually determined by the student and teacher ● Student may request to use a computer to complete assignments ● Establish expectations for correct spelling on assignments ● Extra textbooks for home ● Student may request books on tape/CD/digital media, as available and appropriate ● Assign a peer helper in the class setting ● Provide oral reminders and check student work during independent work time ● Assist student with long and short-term planning of assignments ● Encourage student to proofed assignments and tests ● Provide regular parent/school communication ● Teachers will check/sign student agenda daily ● Student requires use of other assistive technology device <p>Modifications for Homework and Assignments:</p>	<p style="text-align: center;"><u>Students at Risk of School Failure</u></p> <p>Modifications for Classroom:</p> <ul style="list-style-type: none"> ● Pair visual prompts with verbal presentations ● Ask students to restate information, directions, and assignments ● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). ● Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies). ● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena. ● Structure the learning around explaining or solving a social or community-based issue. ● Collaborate with after-school programs or clubs to extend learning opportunities. ● Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.

- Extended time to complete assignments
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication

Modifications for Assessments:

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments

- Repetition and practice
- Model skills/techniques to be mastered
- Extended time to complete class work
- Provide a copy of class notes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments
- Establish expectations for correct spelling on assignments
- Extra textbooks for home
- Student may request books on tape/CD/digital media, as available and appropriate
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short-term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments:

- Extended time to complete assignments
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication

Modifications for Assessments:

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests

- | | |
|--|---|
| | <ul style="list-style-type: none">● Establish procedures for accommodations/modifications for assessments |
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Benway School

Unit 4

Content Area: Algebra 1

Unit Title: Modeling with Statistics

Grade Level: 8

Unit Overview: Students will summarize, represent, and interpret data on a single count or measurement variable. They will also summarize, represent, and interpret data on two categorical and quantitative variables and interpret functions that arise in applications in terms of the context. These skills will be mastered through differentiated activities, cross-curricular lessons, multiple means of assessment and the enhancement of prior skills and knowledge.

Recommended Pacing: 8-10 weeks (April-June)

Student Learning Objectives	NJSLs
<p>Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks). <i>Bold type indicates benchmarked standard. (Identified by PARCC Model Content Frameworks).</i></p>	
Represent data with plots (dot plots, histograms, and box plots) on the real number line. (SMP 1, 2, 4, 5, 6)	S.ID.A.1
Compare center and spread of two or more data sets, interpreting differences in shape, center, and spread in the context of the data, taking into account the effects of outliers. (SMP 1, 2, 4, 5, 6)	S.ID.A.2 S.ID.A.3
Summarize and interpret categorical data for two categories in two-way frequency tables; explain possible associations and trends in the data. (SMP 1, 5, 7)	S.ID.B.5
Fit functions to data using technology, plot residuals and informally assess the fit of linear and non-linear functions by analyzing residuals. (SMP 1, 2, 4, 5, 6)	S.ID.B.6.a.b.
Interpret key features of functions from graphs and tables. Given a verbal description of the relationship, sketch the graph of a function, showing key features and relating the domain of the function to its graph. (SMP 4, 6)	F.IF.B.4 F.IF.B.5
New Jersey Student Learning Standards	Progress Indicator
<p>Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks). <i>Bold type indicates benchmarked standard. (Identified by PARCC Model Content Frameworks).</i></p>	
Represent data with plots on the real number line (dot plots, histograms, and box plots).	S.ID.A.1
Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	S.ID.A.2
Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	S.ID.A.3

Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	S.ID.B.5
Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data (including the use of technology); use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals, including with the use of technology.	S.ID.B.6
For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i>	F.IF.B.4
Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.</i>	F.IF.B.5
Standards for Mathematical Practice	Progress Indicator
Make sense of problems and persevere in solving them.	SMP1
Reason abstractly and quantitatively.	SMP2
Model with mathematics.	SMP4
Use appropriate tools strategically.	SMP5
Attend to precision.	SMP6
Look for and make use of structure.	SMP7
New Jersey Student Learning Standards Technology	Indicator
Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.	8.1.12.A.3
Develop an innovative solution to a real-world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.	8.1.12.C.1
Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.	8.1.12.D.1

Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.	8.1.12.D.2
Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.	8.1.12.F.1
Demonstrate how reusing a product affects the local and global environment.	8.2.2.B.2
Identify products or systems that are designed to meet human needs.	8.2.2.B.3
Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation and maintenance of a chosen product.	8.2.12.B.2
New Jersey Student Learning Standards 21st Century Life and Career Skills	Indicator
Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.	8.1.12.A.3
Develop an innovative solution to a real-world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.	8.1.12.C.1
Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.	8.1.12.D.1
Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.	8.1.12.D.2
Career Ready Practices	Indicator
Apply appropriate academic and technical skills.	CRP2
Communicate clearly and effectively and with reason.	CRP4
Demonstrate creativity and innovation.	CRP6
Utilize critical thinking to make sense of problems and persevere in solving them.	CRP8
Use technology to enhance productivity.	CRP11
Work productively in teams while using cultural global competence.	CRP12
Key Vocabulary Words	
<ul style="list-style-type: none"> ● Population ● Sample ● Bias ● Survey ● Experiment ● Statistic ● Parameter ● Mean ● Median ● Mode ● Range ● Standard deviation ● Variance ● Distribution ● Dot plot 	

- Histogram
- Box and whisker
- Outlier
- Theoretical probability
- Experimental probability
- Permutation
- Combinations

Evidence of Learning

Additional Suggested Assessments:

- Presentations
- Class discussions
- Homework
- Tests/quizzes
- Discussions
- Peer evaluations
- Daily oral language
- Chapter Reading
- Outline/Notes
- Vocabulary Assessments/ Application of Vocabulary
- Exams
- Projects

Learning Activities:

- Differentiated Instructional Groups and Activities
- Small group/ large group discussion
- Exploration of key concepts
- Anchor Activities

Instructional Materials:

Primary:

- Edmodo
- Smartboards
- Internet
- <https://connected.mcgraw-hill.com>

Secondary:

- Supplemental Readings/ Articles based on student interest/discussion
- <http://www.mathgiraffe.com/blog/relevant-math-articles-to-share-with-teens>
- <https://www.nytimes.com/topic/subject/mathematics>

Teacher Resources:

S.ID.A.1-3 Haircut Costs

S.ID.A.1-3 Speed Trap

S.ID.A.2-3 Measuring Variability in a Data Set

S.ID.A.3 Identifying Outliers

S.ID.B.5 Support for a Longer School Day?

S.ID.B.6 Laptop Battery Charge 2

F.IF.B.4 The Aquarium

F.IF.B.4 Containers

F.IF.B.4-5 The Canoe Trip, Variation 2

Modifications & Accommodations:

**Please note that the following modifications and accommodations vary from unit to unit, and may be implemented for any student who would benefit*

Gifted and Talented

(content, process, product, and learning environment)

Extension Activities:

- Conduct research and provide presentation of various topics
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Design surveys to generate and analyze data to be used in discussion.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication
- Anchor activities
- Use of higher-level questioning techniques

English Language Learners**Modifications:**

- Modified assignments
- Native language translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed
- Highlight key vocabulary
- Use graphic organizers

<ul style="list-style-type: none"> ● Provide assessments at a higher-level of thinking 	
<p style="text-align: center;"><u>Students with Disabilities</u> <i>(appropriate accommodations, instructional adaptation, and/or modifications as determined by the IEP or 504 team)</i></p> <p>Modifications for Classroom:</p> <ul style="list-style-type: none"> ● Pair visual prompts with verbal presentations ● Ask students to restate information, directions, and assignments ● Repetition and practice ● Model skills/techniques to be mastered ● Extended time to complete class work ● Provide copy of class notes ● Preferential seating to be mutually determined by the student and teacher ● Student may request to use a computer to complete assignments ● Establish expectations for correct spelling on assignments ● Extra textbooks for home ● Student may request books on tape/CD/digital media, as available and appropriate ● Assign a peer helper in the class setting ● Provide oral reminders and check student work during independent work time ● Assist student with long and short term planning of assignments ● Encourage student to proofread assignments and tests ● Provide regular parent/school communication ● Teachers will check/sign student agenda daily ● Student requires use of other assistive technology device <p>Homework and Assignments:</p> <ul style="list-style-type: none"> ● Extended time to complete assignments ● Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases. ● Provide the student with clearly stated (written) expectations and grading criteria for assignments. 	<p style="text-align: center;"><u>Students at Risk of School Failure</u></p> <p>Modifications for Classroom:</p> <ul style="list-style-type: none"> ● Pair visual prompts with verbal presentations ● Ask students to restate information, directions, and assignments ● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). ● Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies). ● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). ● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. ● Use project-based science learning to connect science with observable phenomena. ● Structure the learning around explaining or solving a social or community-based issue. ● Collaborate with after-school programs or clubs to extend learning opportunities. ● Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. ● Repetition and practice ● Model skills/techniques to be mastered ● Extended time to complete class work ● Provide a copy of class notes ● Preferential seating to be mutually determined by the student and teacher ● Student may request to use a computer to complete assignments

- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication
- Continue to develop phrasing and fluency while reading aloud, as needed
- Encourage silent reading for short periods of time
- Use close reading strategies
- Continue to provide access to various genres
- Make available high interest, low readability texts for use during independent reading
- Use citing the text strategy to develop oral and written summarization skills
- Continue using marking the text strategy
- Write short essays using various supporting strategies such as marking the text, graphic organizers, citing text, and teacher-prompts
- Write routinely and engage in peer editing with teacher guidance

Modifications for Assessments:

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments

- Establish expectations for correct spelling on assignments
- Extra textbooks for home
- Student may request books on tape/CD/digital media, as available and appropriate
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short-term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments:

- Extended time to complete assignments
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT (role, audience, format, topic) activities as they pertain to the types/modes of communication

Modifications for Assessments:

- Extended time on classroom tests and quizzes
- Student may take/complete tests in an alternate setting as needed
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests
- Establish procedures for accommodations/modifications for assessments