

**Belvidere Cluster Wide
Mathematics Curriculum
Algebra
Updated Fall 2018**

All Belvidere Cluster curriculum and instruction areas are aligned to the New Jersey Student Learning Standards (NJSLs) in accordance with the NJ Department of Education's curriculum implementation requirements.

Interdisciplinary Connections

- English Language Arts
- Science and Scientific Inquiry (Next Generation)
- Social Studies
- Technology
- Visual and Performing Arts

Technology Standards and Integration

iPads/Chromebooks

iXL

Holt Online Resources

Interactive SmartBoard activities

NJSLA Technology

8.1.2.A.2

Create a document using a word processing application.

8.1.2.A.4

Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).

8.1.P.B.1

Create a story about a picture taken by the student on a digital camera or mobile device.

8.1.P.C.1

Collaborate with peers by participating in interactive digital games or activities.

8.1.2.E.1

Use digital tools and online resources to explore a problem or issue.

**CAREER EDUCATION
(NJDOE CTE Clusters)**

- Education & Training
- Finance
- Information Technology
- Science, Technology, Engineering & Mathematics (STEM)

21st Century Skills/ Themes

- Financial, Economic, Business and Entrepreneurial Literacy
- Creativity and Innovation
- Critical Thinking
- Problem Solving

- Communication
- Collaboration
- Information Literacy

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

Integrated Accommodations and Modifications

Special Education

- Printed copy of board work/notes provided
- Additional time for skill mastery
- Assistive technology
- Behavior management plan
- Center-Based Instruction
- Check work frequently for understanding
- Computer or electronic device utilization
- Extended time on tests/ quizzes
- Have student repeat directions to check for understanding
- Highlighted text visual presentation
- Modified assignment format
- Modified test content
- Modified test format
- Modified test length
- Multiple test sessions
- Multi-sensory presentation
- Preferential seating
- Preview of content, concepts, and vocabulary
- Reduced/shortened written assignments
- Secure attention before giving instruction/directions
- Shortened assignments
- Student working with an assigned partner
- Teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills Open-ended activities
- Think-Pair-Share
- Varied supplemental materials

ELL

- Allowing students to correct errors (looking for understanding)
- Teaching key aspects of a topic Eliminate nonessential information Using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slideshows, videos, etc.) to demonstrate student's learning
- Allowing students to correct errors (looking for understanding)
- Allowing the use of note cards or open-book during testing
- Decreasing the amount of work presented or required
- Having peers take notes or providing a copy of the teacher's notes
- Modifying tests to reflect selected objectives
- Providing study guides
- Reducing the number of answer choices on a multiple choice test
- Tutoring by peers
- Explain/clarify key vocabulary terms

At Risk

- Allowing students to correct errors (looking for understanding)
- Teaching key aspects of a topic Eliminate nonessential information allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slideshows, videos, etc.) to demonstrate student's learning
- Allowing students to select from given choices .
- Allowing the use of note cards or open-book during testing
- Collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test
- decreasing the amount of work presented or required .
- Having peers take notes or providing a copy of the teacher's notes
- Marking students' correct and acceptable work, not the mistakes
- Modifying tests to reflect selected objectives
- Providing study guides
- Reducing the number of answer choices on a multiple choice test
- Tutoring by peers
- Using authentic assessments with real-life problem-solving
- Using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills Open-ended activities
- Think-Pair-Share
- Varied supplemental materials

Gifted and Talented

- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Independent research and projects Interest groups for real world application
- Learning contracts
- Leveled rubrics
- Multiple intelligence options
- Personal agendas

- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products

504

- Printed copy of board work/notes provided
- Additional time for skill mastery
- Assistive technology
- Behavior management plan
- Center-Based Instruction
- Check work frequently for understanding
- Computer or electronic device utilization
- Extended time on tests/ quizzes
- Have student repeat directions to check for understanding
- Highlighted text visual presentation
- Modified assignment format
- Modified test content
- Modified test format
- Modified test length
- Multiple test sessions
- Multi-sensory presentation
- Preferential seating
- Preview of content, concepts, and vocabulary
- Reduced/shortened written assignments
- Secure attention before giving instruction/directions
- Shortened assignments
- Student working with an assigned partner
- Teacher initiated weekly assignment sheet
- Use open book, study guides, test prototype
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Varied supplemental materials

Algebra 1 Unit Plan # 1	
Title: Numbers, Operations and Expressions	
Subject: Algebra 1	Approximate Time: 1.5 weeks
Unit Summary: The unit introduces the concepts of Algebra and reviews some skills from 8 th grade.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ● Additional Clusters	
Conceptual Category: Algebra Domain: Seeing Structure in Expressions	
Cluster: Interpret the structure of expressions, create equations that describe numbers or relationships	
Standard#:	Standard:
A-SSE.1	Interpret expressions that represent a quantity in terms of its context.
Conceptual Category: Number and Quantity	
Cluster: Use properties of rational and irrational numbers.	
Standard#:	Standard:
N-RN.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.
Domain: Standards for Math Practice	
Standard#:	Standard:
MP1	Making sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.
Unit Essential Question:	Unit Enduring Understandings:
<ul style="list-style-type: none"> • What are the basic skills needed for Algebra I? 	<ul style="list-style-type: none"> • What are irrational numbers? • What are like terms and how to combine them. • Using substitution to evaluate an expression for a value.
Unit Objectives:	
<ul style="list-style-type: none"> • <i>Students will be able to classify numbers in the real number system.</i> • <i>Students will be able to identify and combine like terms.</i> • <i>Students will be able to evaluate an expression for given values.</i> • <i>Students will be able to put terms in order by the degree of a variable.</i> 	
Evidence of Learning	
Possible Formative Assessments:	
<ul style="list-style-type: none"> • SMART Response questions used throughout the unit. • Quizzes • Homework/Classwork • Q and A • Labs/Projects • IXL • First in Math • TenMarks 	
Summative Assessment:	

<ul style="list-style-type: none"> Unit Test 	
Benchmark Assessments: Mid and end of unit teacher-created checkpoints Textbook unit test	
Possible Alternative Assessments: <ul style="list-style-type: none"> Choice boards - projects Skit Demonstration Journaling Conferencing 	
Suggested Lesson Plans	
Topics	Approximate Timeframe
Topic #1: Review of Natural Numbers, Whole Numbers, Integers, and Rational Numbers Suggested Lab: Choose one from the posted list	1 day
Topic #2: Review of Exponents, Squares, and Square Roots	1 day
Topic #3: Review of Irrational Numbers & Real Numbers	1/3 day
Topic #4: Properties of Exponents	1 day
Topic #5: Future Topics for Algebra II	1/3 day
Topic #6: Like Terms	1/3 day
Topic #7: Evaluating Expressions	1/2 day
Topic #8: Ordering Terms	1/2 day
Review & Unit Test	1 day
Curriculum Development Resources: <ul style="list-style-type: none"> http://www.njctl.org/courses/math/algebra-i/numbers-operations-and-expressions-algebra-1/ https://www.khanacademy.org/ Approved Classroom Text 	
Lesson Components	
21st Century Skills <ul style="list-style-type: none"> Financial, Economic, Business, and Entrepreneurial Literacy 21st Century Themes <ul style="list-style-type: none"> Critical Thinking and Problem Solving Communication and Collaboration Life and Career Skills 	

Unit Plan # 2	
Title: Reasoning With Equations	
Subject: Algebra 1	Approximate Time: 7 days
Unit Summary: The unit introduces linear equations. Students learn to solve equations starting from equations with variables on both sides and progressing to more complex equations. The unit concludes with using the skills to transform literal equations so that they are solved for a named variable.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ■ Additional Cluster	
Conceptual Category: Number and Quantity Domain: Quantities	
Cluster: Reason quantitatively and use units to solve problems.	
Standard#:	Standard:
N-Q.1	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.
Conceptual Category: Algebra Domain: Creating Equations	
Cluster: Create equations that describe numbers or relationships	
Standard#:	Standard:
A-CED.1	Create equations and inequalities in one variable and use them to solve problems.
A-CED.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
Conceptual Category: Algebra Domain: Reasoning with Equations and Inequalities	
Cluster: Understand solving equations as a process of reasoning and explain the reasoning	
Standard#:	Standard:
A-REI.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.
Cluster: Solve equations and inequalities in one variable	
A-REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
Conceptual Category: Function Domain: Building Functions	
Cluster: Build a function that represents the relationship between two quantities.	
Standard#:	Standard:
F-BF.1	Write a function that describes the relationship between two quantities.*
Domain: Standards for Math Practice	
Standard#:	Standard:
MP1	Making sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.
Unit Essential Question:	Unit Enduring Understandings:
<ul style="list-style-type: none"> ● How do we represent unknown quantities? ● How can the value of an unknown variable be found? 	<ul style="list-style-type: none"> ● How to solve an equation in one variable. ● How can an equation be solved for a variable in the equation.
Unit Objectives:	

- *Students will be able to solve equations that contain the same variable on both sides.*
- *Students will be able transform a formula to a different form of that equation.*
- *Students will be able to find the value of unknown quantities using Literal Equations and Substitution.*

Evidence of Learning

Possible Formative Assessments:

- SMART Response questions used throughout the unit.
- Quizzes
- Homework/Classwork
- Q and A
- Labs/Projects
- IXL
- First in Math
- TenMarks

Summative Assessment:

- Unit Test

Benchmark Assessments:

Mid and end of unit teacher-created checkpoints
Textbook unit test

Possible Alternative Assessments:

- Choice boards - projects
- Skit
- Demonstration
- Journaling
- Conferencing

Suggested Lesson Plans

Lessons	Approximate Timeframe
Lesson #1: Equations with the Same Variable on Both Sides	1 day
Lesson #2: Solving Literal Equations	2 days
Suggested Lab: Falling Rocks and Glowsticks	1 day
Lesson #3: Substituting Values into an Equation	1 day
Lesson #4: Review and Unit Test	2 days

Curriculum Resources:

- www.njctl.org/courses/math/algebra-i/equations-algebra-i/
- <http://threeacts.mrmeyer.com/fallingrocks/>
- <http://threeacts.mrmeyer.com/fallingglowsticks/>
- <http://blog.mrmeyer.com/2013/teaching-with-three-act-tasks-act-one/>
- <https://www.khanacademy.org/>
- Approved Classroom Textbooks

Lesson Components

21st Century Skills

- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Themes

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Life and Career Skills

Algebra 1 Unit Plan # 3	
Title: Graphing Linear Equations	
Subject: Algebra 1	Approximate Time: 3.3 weeks
Unit Summary: The unit covers how to graph linear equations and different forms the equations can be written in. Students will also learn how write the equation of a line with given qualities. The relationships between vertical and horizontal lines will be covered. Students will also analyze scatter plots and determine the prediction equation for the line of best fit.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ● Additional Clusters	
Conceptual Category: Algebra Domain: Creating Equations	
Cluster: Create equations that describe numbers or relationships	
Standard#:	Standard:
A.CED.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
Conceptual Category: Algebra Domain: Reasoning with Equations and Inequalities	
Cluster: Represent and solve equations and inequalities graphically	
Standard#:	Standard:
A.REI.10	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).
Conceptual Category: Functions: Interpreting Functions	
Cluster: Analyze functions using different representations	
Standard#:	Standard
F.IF.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
Conceptual Category: Statistics Domain: Interpreting Categorical and Quantitative Data	
Cluster: Summarize, represent, and interpret data on two categorical and quantitative variables	
Standard#:	Standard:
S.ID.6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
Cluster: Interpret linear models	
Standard#:	Standard:
S.ID.7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
Domain: Standards for Math Practice	
Standard#:	Standard:
MP1	Making sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.
Unit Essential Question:	Unit Enduring Understandings:
<ul style="list-style-type: none"> What is meant by the slope of a line, and how can knowing a line's slope help to graph a line and find parallel and perpendicular lines? 	<ul style="list-style-type: none"> Slope (rate of change) How to graph a line.

	<ul style="list-style-type: none"> • Know the different forms the equation a line can take • Intercepts of a line • Horizontal and Vertical lines • How to write the equation of a line given characteristics of the line. • Scatter plot • Line of Best Fit
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Unit Objectives:

- *Students will be able to graph a line using intercepts.*
- *Students will be able to graph horizontal and vertical lines.*
- *Students will be able to calculate the slope of a line when given a graph, or two points.*
- *Students will be able to describe how slope relates to horizontal and vertical lines.*
- *Students will be able to write and graph the equation of a line using point-slope form.*
- *Students will be able to write and graph the equation of a line using slope-intercept form.*
- *Students will be able to determine if a proportional relationship exists between sets of points.*
- *Students will be able to write and graph the equation of a line that has a proportional relationship.*
- *Students will be able to write the equation of a line based on the given information.*
- *Students will be able to solve problems using the equation of a line.*
- *Students will be able to determine whether or not a scatter plot has a linear relationship.*
- *Students will be able to draw the line of best fit to model the data in a scatter plot that has a linear relationship and use the line of best fit to solve problems.*

Evidence of Learning

Possible Formative Assessments:

- SMART Response questions used throughout the unit.
- Quizzes
- Homework/Classwork
- Q and A
- Labs/Projects
- IXL
- First in Math
- TenMarks

Summative Assessment:

- Unit Test

Benchmark Assessments:

Mid and end of unit teacher-created checkpoints
Textbook unit test

Possible Alternative Assessments:

- Choice boards - projects
- Skit
- Demonstration
- Journaling
- Conferencing

Suggested Lesson Plan

Topics	Approximate Timeframes
Topic #1: Linear Equations	1 day
Topic #2: Graphing a Linear Equations Using Intercepts	1 day
Topic #3: Horizontal & Vertical Lines	½ day
Topic #4: Slope of a Line	1 ½ days
Topic #5: Point-Slope Form	1 ½ days

Suggested Lab: PhET Exploring Slope-Intercept Form of a Line Topic #6: Slope-Intercept Form	2 days
Suggested Lab: Proportional Relationships Topic #7: Proportional Relationships	1 ½ days
Topic #8: Solving Linear Equations	2 days
Topic 9: Scatter Plots and Line of Best Fit Suggested labs below: <ul style="list-style-type: none"> • Lab: Candles • Lab: Barbie Bungie Jumping • Lab: RAFT – Stars on the HR Diagram 	2 days
Topic #10: Review and Unit Test	2 days
Curriculum Resources: <ul style="list-style-type: none"> • www.njctl.org/courses/math/algebra-i/ • https://www.khanacademy.org/ • https://phet.colorado.edu/en/contributions/view/3915 • https://phet.colorado.edu/en/simulation/graphing-slope-intercept • http://illuminations.nctm.org/Lesson.aspx?id=2157 • http://www.raftbayarea.org/ideas/Stars%20on%20the%20HR%20Diagram.pdf • Approved Classroom Text 	
Lesson Components	
21st Century Skills <ul style="list-style-type: none"> • Financial, Economic, Business, and Entrepreneurial Literacy 21st Century Themes <ul style="list-style-type: none"> • Critical Thinking and Problem Solving • Communication and Collaboration • Life and Career Skills 	

Mathematics Curriculum	
Algebra 1	
Unit Plan # 4	
Title: Systems of Equations	
Subject: Algebra 1	Approximate Time: 2.8 weeks
Unit Summary: The unit uses graphing, elimination, and substitution to solve systems of equations. Situations will be modeled with systems and solved.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ■ Additional Clusters + Additional Standard	
Conceptual Category: Algebra Domain: Creating Equations	
Cluster: Create equations that describe numbers or relationships	
Standard#:	Standard:
A-CED.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
Conceptual Category: Algebra Domain: Reasoning with Equations and Inequalities	
Cluster: Solve systems of equations	
Standard#:	Standard:
A-REI.5	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.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
Cluster: Represent and solve equations and inequalities graphically	
Standard#:	Standard:
A-REI.11	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.
Domain: Standards for Math Practice	
Standard#:	Standard:
MP1	Making sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.
Unit Essential Question:	Unit Enduring Understandings:
<ul style="list-style-type: none"> How can real world situations be modeled by systems? How can solutions be found to a system? 	<ul style="list-style-type: none"> The point at which lines intersect is the solution to the system with those lines.
Unit Objectives:	
<ul style="list-style-type: none"> Students will be able to graph systems of linear equations to find a solution. Students will be able to solve a system of equations by using substitution and elimination. Students will be able to translate real world problem into a system. 	

Evidence of Learning	
Possible Formative Assessments: <ul style="list-style-type: none"> ● SMART Response questions used throughout the unit. ● Quizzes ● Homework/Classwork ● Q and A ● Labs/Projects ● IXL ● First in Math ● TenMarks 	
Summative Assessment: <ul style="list-style-type: none"> ● Unit Test 	
Benchmark Assessments: Mid and end of unit teacher-created checkpoints Textbook unit test	
Possible Alternative Assessments: <ul style="list-style-type: none"> ● Choice boards - projects ● Skit ● Demonstration ● Journaling ● Conferencing 	
Suggested Lesson Plan	
Topics	Approximate Time frame
Topic #1: Solving Systems by Graphing	2 days
Topic #2: Solving Systems by Substitution	2 days
Topic #3: Solving Systems by Elimination	2 days
Suggested Lab: MAP – Boomerangs	1 day
Topic #4: Choosing a Strategy	1 day
Suggested Lab: Illuminations – Supply and Demand	1 day
Topic #5: Writing Systems to Model Situations	1 day
Topic #6: Extension: Solving Systems of Non-linear Equations	1 day
Topic #6: Review and Unit Test	2 days
Curriculum Resources: <ul style="list-style-type: none"> ● www.njctl.org/courses/math/algebra-i/ ● http://illuminations.nctm.org/Lesson.aspx?id=2544 ● http://map.mathshell.org/lessons.php?collection=8&unit=9205 ● https://www.khanacademy.org/ ● Approved Classroom Text 	
Lesson Components	
21st Century Skills <ul style="list-style-type: none"> ● Financial, Economic, Business, and Entrepreneurial Literacy 21st Century Themes <ul style="list-style-type: none"> ● Critical Thinking and Problem Solving ● Communication and Collaboration ● Life and Career Skills 	

Mathematics Curriculum	
Algebra 1	
Unit Plan # 5	
Title: Solving & Graphing Linear Inequalities	
Subject: Algebra 1	Approximate Time: 2.5 – 3 weeks
Unit Summary: The unit builds upon the methods of solving equations and demonstrates the similarities and differences between solving equations and solving inequalities. The unit concludes with graphing linear inequalities and systems of linear inequalities in the coordinate plane.	
Learning Targets	
Conceptual Category: Algebra Domain: Creating Equations	
Cluster: Create equations that describe numbers or relationships	
Standard#:	Standard:
A-CED.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
A-CED.3	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.
Conceptual Category: Algebra Domain: Reasoning with Equations and Inequalities	
Cluster: Solve equations and inequalities in one variable	
Standard#:	Standard:
A-REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
Cluster: Represent and solve equations and inequalities graphically.	
Standard#:	Standard:
A-REI.12	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.
Domain: Standards for Math Practice	
Standard#:	Standard:
MP1	Making sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.
Unit Essential Question:	Unit Enduring Understandings:
<ul style="list-style-type: none"> ● How can related values that are not equivalent be represented? ● How do we solve for a variable in an inequality? ● How do we graph a linear inequality in the coordinate plane? ● How do we solve a system of linear inequalities? 	<ul style="list-style-type: none"> ● The vocabulary associated with inequalities. ● Steps used to solve inequalities. ● The difference between and & or statements.
Unit Objectives:	
<ul style="list-style-type: none"> ● <i>Students will be able to write an inequality.</i> ● <i>Students will be able to solve one-step inequalities.</i> ● <i>Students will be able to solve two-step and multiple step inequalities.</i> ● <i>Students will be able to graph a single inequality on a number line.</i> 	

- Students will be able to solve compound inequalities and graph them on a number line.
- Students will be able to explain the difference between disjunctions and conjunctions.
- Students will be able to graph a linear inequality that contains two variables in a coordinate plane.
- Students will be able to solve and graph a system of linear inequalities by graphing them in a coordinate plane.

Evidence of Learning

Possible Formative Assessments:

- SMART Response questions used throughout the unit.
- Quizzes
- Homework/Classwork
- Q and A
- Labs/Projects
- IXL
- First in Math
- TenMarks

Summative Assessment:

- Unit Test

Benchmark Assessments:

Mid and end of unit teacher-created checkpoints
Textbook unit test

Possible Alternative Assessments:

- Choice boards - projects
- Skit
- Demonstration
- Journaling
- Conferencing

Suggested Lesson Plans

Topics	Approximate Timeframe
Topic #1: Simple Inequalities (add/subtraction)	1 day
Topic #2: Simple Inequalities (multi/division)	1 day
Suggested Lab: Inequality Bingo	½ day
Topic #3: Two-Step & Multi-Step	1 day
Topic #4: Compound Inequalities	1 day
Topic #5: Special Cases of Compound Inequalities	½ day
Topic #6: Graphing Linear Inequalities in Slope-Intercept Form	2 day
Suggested Lab: Solving Inequalities	1 day
*Optional Lab: Illuminations – Dirt Bike Dilemma	*2 days
Topic #7: Solving Systems of Inequalities	1 days
Topic #8: Review and Unit Test	2 days

Curriculum Resources:

- www.njctl.org/courses/math/algebra-i/
- http://www.doe.virginia.gov/testing/solsearch/sol/math/A/m_ess_a-5a.pdf
- <http://illuminations.nctm.org/Lesson.aspx?id=2355>
- <https://www.khanacademy.org/>
- Approved Classroom Text

Lesson Components

21st Century Skills

- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Themes

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Life and Career Skills

Belvidere Cluster Wide Mathematics Curriculum Algebra 1 Unit Plan # 6	
Title: Solving Absolute Value Equations & Inequalities	
Subject: Algebra 1	Approximate Time: 1 week
Unit Summary: The unit reviews the inverse operations used to solve equations and inequalities. Students learn to solve absolute value equations and graph their solutions on a number line. The unit concludes with the derivation of the compound inequalities required to graph absolute value inequalities. Word problems are also solved throughout this unit.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ■ Additional Clusters	
Conceptual Category: Algebra Domain: Creating Equations	
Cluster: Create equations that describe numbers or relationships	
Standard#:	Standard:
A-CED.1	Create equations and inequalities in one variable and use them to solve problems.
A-CED.3	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.
Conceptual Category: Algebra Domain: Reasoning with Equations and Inequalities	
Cluster: Understand solving equations as a process of reasoning and explain the reasoning	
Standard#:	Standard:
A-REI.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.
Cluster: Solve equations and inequalities in one variable	
A-REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
Domain: Standards for Math Practice	
Standard#:	Standard:
MP1	Making sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.
Unit Essential Question:	Unit Enduring Understandings:
<ul style="list-style-type: none"> How do we represent unknown quantities? How can the value of an unknown variable be found? 	<ul style="list-style-type: none"> How to solve an absolute value equation in one variable. How to solve an absolute value inequality in one variable.
Unit Objectives:	
<ul style="list-style-type: none"> Students will be able to solve absolute value equations. Students will be able to solve absolute value inequalities. Students will be able to write an absolute value equation or inequality to model real-world problems. 	
Evidence of Learning	
Possible Formative Assessments:	

- SMART Response questions used throughout the unit.
- Quizzes
- Homework/Classwork
- Q and A
- Labs/Projects
- IXL
- First in Math

Summative Assessment:

- Unit Quiz

Benchmark Assessments:

Mid and end of unit teacher-created checkpoints
Textbook unit test

Possible Alternative Assessments:

- Choice boards - projects
- Skit
- Demonstration
- Journaling
- Conferencing

Suggested Lesson Plans

Lessons	Approximate Timeframe
Lesson #1: Absolute Value Equations	2 days
Lesson #2: Absolute Value Inequalities	2 days
Lesson #3: Unit Quiz	1 day
Curriculum Resources: <ul style="list-style-type: none"> ● www.njctl.org/courses/math/algebra-i/ ● https://www.khanacademy.org/ ● Approved Classroom Text 	

Lesson Components

21st Century Skills

- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Themes

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Life and Career Skills

**Belvidere Cluster Wide
Mathematics Curriculum
Algebra 1
Unit Plan # 7**

Title: Relationships Between Quantities

Subject: Algebra 1

Approximate Time: 2 weeks

Unit Summary: This unit covers how to convert different units using conversion factors. The unit will also discuss how to pick the unit that is the most appropriate for a given situation, and what the most appropriate accuracy is for a given situation.

Learning Targets

PARCC ■ Major Clusters; □ Supporting Clusters; ● Additional Clusters

Conceptual Category: Number and Quantity **Domain:** Quantities*

Cluster: Reason quantitatively and use units to solve problems.

Standard#:

Standard:

N-Q.A.1

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.2

Define appropriate quantities for the purpose of descriptive modeling.

N-Q.A.3

Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

* All of the standards in this domain are modeling standards

Domain: Standards for Math Practice

Standard#:

Standard:

MP1

Making sense of problems and persevere in solving them.

MP2

Reason abstractly and quantitatively.

MP3

Construct viable arguments and critique the reasoning of others.

MP4

Model with mathematics.

MP5

Use appropriate tools strategically.

MP6

Attend to precision.

MP7

Look for and make use of structure.

MP8

Look for and express regularity in repeated reasoning.

Unit Essential Question:

- How can you convert and estimate different units to solve real world problems?

Unit Enduring Understandings:

- Convert one unit of measure.
- Convert multiple units of measure.
- Picking the appropriate type of unit for measurement.
- Picking the appropriate level of accuracy.

Unit Objectives:

- *Students will be able to convert a unit of measurement to a different unit.*
- *Students will be able to convert rate of measurement to different rates.*
- *Students will be able to pick the appropriate type of unit for a desired measurement.*
- *Students will be able to construct a system of linear equations to model a given situation containing the same unit of measurement.*
- *Students will be able to pick the appropriate level of accuracy for a given situation.*

Evidence of Learning

Possible Formative Assessments:

- SMART Response questions used throughout the unit.
- Quizzes

- Homework/Classwork
- Q and A
- Labs/Projects
- IXL
- First in Math
- TenMarks

Summative Assessment:

- Unit Test

Benchmark Assessments:

Mid and end of unit teacher-created checkpoints

Textbook unit test

Possible Alternative Assessments:

- Choice boards - projects
- Skit
- Demonstration
- Journaling
- Conferencing

Suggested Lesson Plans

Topics	Approximate Timeframes
Topic #1: Relationships Between Different Units of Measurement	1 ½ days
Suggested Lab: MARS - Yogurt	1 day
Topic #2: Picking the Appropriate Level of Measure	1 day
Topic #3: Systems of Equations with Different Units of Measurement	2 days
Topic #4: Choosing the Appropriate Level of Accuracy	1 day
Topic #4: Review and Unit Test	2 days

Curriculum Resources:

- www.njctl.org/courses/math/algebra-i/
- <http://map.mathshell.org/materials/tasks.php?taskid=272&subpage=apprentice>
- <https://www.khanacademy.org/>
- Approved Classroom Text

Lesson Components

21st Century Skills

- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Themes

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Life and Career Skills

Belvidere Cluster Wide Mathematics Curriculum Algebra 1 Unit Plan # 8	
Title: Functions	
Subject: Algebra 1	ApproximateTime: 2.8 weeks
Unit Summary: The unit defines the key features of functions, and uses explicit and recursive formulas to define sequences. The unit explores and compares the multiple representations of functions and transformations of linear functions.	
Learning Targets	
Conceptual Category: Functions: Interpreting Functions	
Cluster: Understand the concept of a function and the function notation.	
Standard#	Standard:
F-IF.1	Understand that a function from one set (called the domain) another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function of x and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to input x . The graph of f is the graph of the equation $y = f(x)$.
F-IF.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
F-IF.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of integers. For example, the Fibonacci sequence is defined recursively by $f(0) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.
Cluster: Interpret functions that arise in applications in terms of the context.	
Standard	Standard:
F-IF.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
Cluster: Analyze function using different representations.	
F-IF.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, of by verbal description).
Conceptual Category: Functions: Building Functions	
Cluster: Build a function that describes the relationship between two quantities	
Standard#	Standard:
F.BF.1	Write a function that describes the relationship between two quantities
F.BF.2	Write arithmetic & geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
Cluster: Build new functions from existing functions.	
F.BF.3	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.
Unit Essential Questions: <ul style="list-style-type: none"> How do you use a formula to identify the terms of a sequence? 	Unit Enduring Understandings: <ul style="list-style-type: none"> The definition of a function. The difference between the domain and range. Know how to evaluate functions. How to generate explicit and recursive formulas.

<ul style="list-style-type: none"> • What are the multiple ways a function can be represented? • How do you write a linear function after a given transformation? 	<ul style="list-style-type: none"> • Know how to find the rate of change.
<p>Unit Objectives:</p> <ul style="list-style-type: none"> • <i>Students will be able to define a function and identify its domain and range.</i> • <i>Students will be able to evaluate functions.</i> • <i>Students will be able to write recursive and explicit formulas.</i> • <i>Students will be able to compare the rate of change of multiple representations of functions.</i> • <i>Students will be able to write a linear function after a given transformation.</i> • <i>Students will be able to determine the transformation(s) that occur between 2 linear functions.</i> 	
<p>Evidence of Learning</p>	
<p>Possible Formative Assessments:</p> <ul style="list-style-type: none"> • SMART Response questions used throughout the unit. • Quizzes • Homework/Classwork • Q and A • Labs/Projects • IXL • First in Math • TenMarks 	
<p>Summative Assessment:</p> <ul style="list-style-type: none"> • Unit Test 	
<p>Benchmark Assessments:</p> <p>Mid and end of unit teacher-created checkpoints Textbook unit test</p>	
<p>Possible Alternative Assessments:</p> <ul style="list-style-type: none"> • Choice boards - projects • Skit • Demonstration • Journaling • Conferencing 	
<p>Suggested Lesson Plan</p>	
<p>Lessons</p>	<p>Approximate Timeframe</p>
Topic # 1: Relations and Functions	1 day
Topic # 2: Domain and Range	1 day
Suggested Lab: Domain and Range Matching	½ day
Topic #3: Evaluating Functions	1 day
Topic # 4: Explicit and Recursive Functions	1 day
Topic # 5: Multiple Representation of Functions	1 day
Suggested Lab: MARS – Functions and Everyday Situations	1 day
Suggested Lab: Investigation of Transformations with Linear Functions	½ day
Topic #6: Transformations with Linear Functions	3 days
Topic #7: Review and Unit Test	2 days
<p>Curriculum Resources:</p> <ul style="list-style-type: none"> • www.njctl.org/courses/math/algebra-i/ • http://www.apsva.us/cms/lib2/VA01000586/Centricity/Domain/2317/S1%20Domain-Range%20Matching.pdf • http://map.mathshell.org/materials/download.php?fileid=1259 • https://www.khanacademy.org/ 	

• Approved Class Text	
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Belvidere Cluster Wide Mathematics Curriculum Algebra 1 Unit Plan # 9	
Title: Exponential Functions	
Subject: Algebra 1	Approximate Time: 2.4 weeks
Unit Summary: The unit examines exponential growth and decay.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ■ Additional Clusters	
Conceptual Category: Functions: Interpreting Functions	
Cluster: Interpret functions that arise in terms of the context.	
Standard#:	Standard:
F-IF.4	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.
F-IF.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
F-IF.6	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.
Cluster: Analyze functions using different representations.	
Standard#:	Standard:
F-IF.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
F-IF.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
Cluster: Analyze functions using different representations.	
Standard#:	Standard:
F-IF.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
Conceptual Category: Functions: Building Functions	
Cluster: Build a function that describes the relationship between two quantities	
Standard#:	Standard:
F-BF.1	Write a function that describes a relationship between two quantities.
Conceptual Category: Functions: Linear Quadratic & Exponential Models	
Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.	
Standard#:	Standard:
F-LE.1	Distinguish between situations that can be modeled with linear functions and with exponential functions.
F-LE.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
Cluster: Interpret expressions for functions in terms of the situation they model.	
Standard#:	Standard:
F-LE.5	Interpret the parameters in a linear or exponential function in terms of a context.

<p>Unit Essential Question:</p> <ul style="list-style-type: none"> • How do exponential functions differ from linear functions? 	<p>Unit Enduring Understandings:</p> <ul style="list-style-type: none"> • Know what exponential growth is. • The difference between growth rate and a growth factor. • Know what exponential decay is.
<p>Unit Objectives:</p> <ul style="list-style-type: none"> • <i>Students will be to identify exponential relationships from fro a table, a graph, and an equation.</i> • <i>Students will be able to calculate growth rates and factors.</i> • <i>Students will be able identify exponential decay.</i> • <i>Students will be able to simplify expressions using rules of exponents.</i> 	
<p>Evidence of Learning</p>	
<p>Possible Formative Assessments:</p> <ul style="list-style-type: none"> • SMART Response questions used throughout the unit. • Quizzes • Homework/Classwork • Q and A • Labs/Projects • IXL • First in Math • TenMarks 	
<p>Summative Assessment:</p> <ul style="list-style-type: none"> • Unit Test 	
<p>Benchmark Assessments:</p> <p>Mid and end of unit teacher-created checkpoints Textbook unit test</p>	
<p>Possible Alternative Assessments:</p> <ul style="list-style-type: none"> • Choice boards - projects • Skit • Demonstration • Journaling • Conferencing 	
<p>Suggested Lesson Plan</p>	
<p>Topics</p>	<p>Approximate Time frame</p>
<p>Topic #1: Exponential Growth Intro</p>	<p>1</p>
<p>Topic #2: Exponential Relationship in Equations, Tables & Graphs</p>	<p>1</p>
<p>Topic #3: Growth Rates and Growth Factors</p>	<p>1</p>
<p>Suggested Lab: Elimination</p>	<p>½</p>
<p>Topic #4: Exponential Decay</p>	<p>1</p>
<p>Topic #5: Exponential vs. Linear</p>	<p>1.5</p>
<p>Topic #6: Writing & Solving Model Equations</p>	<p>1.5</p>
<p>Review & Test</p>	<p>2</p>
<p>Curriculum Resources:</p> <ul style="list-style-type: none"> • www.njctl.org/courses/math/algebra-i/ • https://www.khanacademy.org/ • Approved Class Text 	
<p>Lesson Components</p>	
<p>21st Century Skills</p> <ul style="list-style-type: none"> • Financial, Economic, Business, and Entrepreneurial Literacy 	

21st Century Themes

- Critical Thinking and Problem Solving, Communication and Collaboration, Life and Career Skills

**Belvidere Cluster Wide
Mathematics Curriculum
Algebra 1
Unit Plan # 10**

Title: Polynomials**Subject:** Algebra 1**Approximate Time:** 3.5 weeks

Unit Summary: The unit explores operations that can be done with polynomials. Students will first learn how to describe monomials and polynomials, then they will learn to add, subtract and multiply them. The unit also explores various methods of factoring.

Learning TargetsPARCC Major Clusters; Supporting Clusters; Additional Clusters**Conceptual Category: Algebra Domain: Seeing Structure in Expressions****Cluster: Interpret the structure of expressions****Standard#:****Standard:****A-SSE.2**

Use the structure of an expression to identify ways to rewrite it.

Cluster: Write expressions in equivalent forms to solve problems**Standard#:****Standard:****A-SSE.3**

Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

Conceptual Category: Algebra Domain: Arithmetic with Polynomials and Rational Expressions**Cluster: Perform arithmetic operations on polynomials****Standard#:****Standard:****A-APR.1**

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.

Unit Essential Question:

- How can factoring help to simplify a polynomial?

Unit Enduring Understandings:

- To add or subtract polynomials, only like terms can be combined.
- To multiply polynomials, each term of the terms of one polynomial is multiplied to each term of the second polynomial.
- Factoring is another way of rewriting a polynomial.

Unit Objectives:

- *Students will be able to describe and identify monomials, polynomials, and degrees.*
- *Students will be able to add and subtract polynomials.*
- *Students will be able to multiply a polynomial by a monomial.*
- *Students will be able to multiply two polynomials.*
- *Students will be able to recognize and factor monomials out of a polynomial.*
- *Students will be able to factor trinomials.*
- *Students will be able to factor a polynomial with 4 terms using the grouping method.*

Evidence of Learning**Possible Formative Assessments:**

- SMART Response questions used throughout the unit.
- Quizzes

- Homework/Classwork
- Q and A
- Labs/Projects
- IXL
- First in Math
- TenMarks

Summative Assessment:

- Unit Test

Benchmark Assessments:

Mid and end of unit teacher-created checkpoints
Textbook unit test

Possible Alternative Assessments:

- Choice boards - projects
- Skit
- Demonstration
- Journaling
- Conferencing

Suggested Lesson Plan

Topics	Approximate Timeframe
Topic #1: Definitions of Monomials, Polynomials, and Degrees	½ day
Topic #2: Adding & Subtract Polynomials	1 day
Suggested Lab: RAFT – Mom’s Playoff	½ day
Topic #3: Multiplying a Polynomial by a Monomial	½ day
Topic #4: Multiplying a Polynomial by a Polynomial	1 ½ days
Topic #5: Special Binomial Products	1 day
Topic #6: Factors and GCF	½ day
Topic #7: Factoring out GCF’s	1 day
Topic #8: Factoring using Special Patterns	1 day
Topic #9: Identifying & Factoring x^2+bx+c	1 day
Topic #10: Factoring Trinomials ax^2+bx+c	1 day
Topic#11: Factoring 4 term polynomials	1 day
Topic #12: Mixed Factoring	1 day
Suggested Lab: RAFT – Polynomial Pancakes	½ day
Topic #14: Review and Unit Test	2 days

Curriculum Resources:

- <https://njctl.org/courses/math/algebra-i/>
- <http://www.raftbayarea.org/ideas/Polynomial%20Pancakes.pdf>
- <http://www.raftbayarea.org/ideas/MoMs%20Playoffs.pdf>
- <https://www.khanacademy.org/>
- District Approved textbooks

**Belvidere Cluster Wide
Mathematics Curriculum
Algebra 1
Unit Plan # 11**

Title: Quadratics

Subject: Algebra 1

Approximate Time: 3.6 weeks

Unit Summary: The unit builds on the quadratic polynomials studied in the previous unit. This unit looks at the quadratic polynomials graphically, examining the different methods to find the zeros of the graph.

Learning Targets

PARCC ■ Major Clusters; ■ Supporting Clusters; ■ Additional Clusters

Conceptual Category: Algebra Domain: Seeing Structure in Expressions

Cluster: Interpret the structure of expressions

Standard#:

Standard:

A-SSE.1

Interpret expressions that represent a quantity in terms of its context.*

A-SSE.2

Use the structure of an expression to identify ways to rewrite it.

Cluster: Write expressions in equivalent forms to solve problems

Standard#:

Standard:

A-SSE.3

Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

Conceptual Category: Algebra Domain: Reasoning with Equations and Inequalities

Cluster: Solve equations and inequalities in one variable

Standard#:

Standard:

A-REI.4

Solve quadratic equations in one variable.

Conceptual Category: Algebra Domain: Arithmetic with Polynomials & Rational Expressions

Cluster: Understand the relationship between zeros and factors of polynomials

Standard#:

Standard:

A-APR.3

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.

Conceptual Category: Function Domain: Interpreting Functions

Cluster: Interpret functions as they arise in applications in terms of context

Standard#:

Standard:

F-IF.4

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.*

F-IF.6

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.*

Cluster: Analyze functions using different representations

Standard#:

Standard:

F-IF.7

Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*

F-IF.8

Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

* indicates a modeling standard

Unit Essential Question:

- How can factoring help to solve an equation?

Unit Enduring Understandings:

<ul style="list-style-type: none"> ● In what ways can the zeros of a quadratic be found and can this help us find when an object is in free-fall? 	<ul style="list-style-type: none"> ● The characteristics and properties of a graph of a quadratic (parabola) ● What it means to solve a quadratic. ● If the product of two factors is zero, one of the factors is zero. ● The quadratic formula and the discriminant.
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Unit Objectives:

- *Students will be able to identify the parts of quadratics.*
- *Students will be able to calculate the axis of symmetry and vertex of a quadratic function when it is in standard form.*
- *Students will be able to find the zeros of a quadratic function by graphing it in a coordinate plane.*
- *Students will be able to solve quadratic equations using the zero product property.*
- *Students will be able to solve quadratic equations and polynomials by factoring.*
- *Students will be able to solve quadratic equations using square roots.*
- *Students will be able to solve quadratic equations by completing the square.*
- *Students will be able to identify the nature of the roots of a quadratic using the discriminant.*
- *Students will be able to solve quadratic equations using the quadratic formula.*
- *Students will be able to solve polynomial equations using u-substitution.*
- *Students will be able to solve application problem using methods for solving quadratic equations.*

Evidence of Learning

Possible Formative Assessments:

- SMART Response questions used throughout the unit.
- Quizzes
- Homework/Classwork
- Q and A
- Labs/Projects
- IXL
- First in Math
- TenMarks

Summative Assessment:

- Unit Test

Benchmark Assessments:

Mid and end of unit teacher-created checkpoints
Textbook unit test

Possible Alternative Assessments:

- Choice boards - projects
- Skit
- Demonstration
- Journaling
- Conferencing

Suggested Lesson Plan

Topics	Approximate Timeframes
Topic #1: Characteristics of a Quadratic Equations	1 day
Topic #2: Graphing Quadratic Equations	1 day
Topic #3: Solve Quadratic Equations by Graphing	½ day
Suggested Lab: Illuminations – Building Connections	1 day
Topic #4: Solving Equations with the Zero Product Property	½ day
Topic #5: Solve Quadratic Equations by Factoring	1 ½ days
Topic #6: Solve Quadratic Equations by using Square Roots	1 day
Topic #7: Solve Quadratic Equations by Completing the Square	1 day

Topic #8: Intro to the Quadratic Formula & The Discriminant	1 day
Topic #9: Solve Quadratic Equations by using the Quadratic Formula	1 day
Topic #10: Solving Polynomial Equations using U-Substitution	1 day
Topic #11: Solving Applications Problems	1 day
Suggested Lab Lab: Math in Basketball Lab: RAFT – Aquatic Quadratics	1 day
Suggested Lab: Illuminations – Egg Launch Contest	1 day
Topic #12: Review and Unit Test	2 days
Curriculum Resources: <ul style="list-style-type: none"> ● https://njctl.org/courses/math/algebra-i/ ● http://www.raftbayarea.org/readpdf?isid=661 ● http://www.thirteen.org/get-the-math/the-challenges/math-in-basketball/introduction/181/ ● http://illuminations.nctm.org/Lesson.aspx?id=1091 ● http://illuminations.nctm.org/Lesson.aspx?id=2650 ● https://www.khanacademy.org/ ● District Approved Textbooks 	

Belvidere Cluster Wide Mathematics Curriculum Algebra 1 Unit Plan # 12	
Title: Non-Linear Functions	
Subject: Algebra 1	Approximate Time: 3 weeks
Unit Summary: The unit defines the parts of quadratic functions, and the multiple ways to graph a parabola. The unit compares features of multiple functions.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ■ Additional Clusters	
Conceptual Category: Functions: Interpreting Functions	
Cluster: Interpret functions that arise in applications in terms of the context.	
Standard#:	Standard:
F-IF.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of quantities and sketch graphs, showing key features in given a verbal description of the relationship.
F-IF.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
F-IF.6	Calculate the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change of the graph.
Cluster: Analyze function using different representations.	
Standard #	Standard:
F-IF.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
F-IF.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal description).
Conceptual Category: Functions: Building Functions	
Cluster: Build a function that models a relationship between two quantities.	
F.BF.1	Write a function that describes relationship between two quantities.
F.BF.3	Identify the key effect on the graph of replacing $f(x)$ by $f(x) + k$, $f(kx)$, 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 and explanation of the effects of the graph using technology.
Conceptual Category: Functions: Linear, Quadratic, and Exponential Models	
Cluster: Construct and compare linear, quadratic, and exponential models and solve problems.	
F.LE.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
Cluster: Interpret expressions for functions in terms of the situation they model.	
F.LE.5	Interpret the parameters in a linear or exponential function in terms of a context.
Unit Essential Question:	Unit Enduring Understandings:
<ul style="list-style-type: none"> What are the key features of a quadratic equation? How do you graph a quadratic function in standard form, vertex form, and intercept form? 	<ul style="list-style-type: none"> The parts of a parabola. Know how to graph a quadratic function. How to determine and write the transformations of a parabola.

	<ul style="list-style-type: none"> • How to compare features of functions.
Unit Objectives: <ul style="list-style-type: none"> • <i>Students will be able to identify the key features of a parabola.</i> • <i>Students will be able to graph a parabola when the equation is in standard form.</i> • <i>Students will be able to graph a quadratic function using intercept form.</i> • <i>Students will be able to graph a quadratic function using vertex form</i> • <i>Students will be able to solve application problems by writing a quadratic function in its desired form.</i> • <i>Students will be able to calculate the roots of a quadratic equation when it is in vertex form.</i> • <i>Students will be able to determine the transformations of a parabola from its parent function.</i> • <i>Students will be able to determine the equation of a new function after its parent function went through a transformation.</i> • <i>Students will be able to graphically analyze the behavior of non-linear functions.</i> • <i>Students will be able to compare key features of linear, quadratic, and exponential functions.</i> 	
Evidence of Learning	
Possible Formative Assessments: <ul style="list-style-type: none"> • SMART Response questions used throughout the unit. • Quizzes • Homework/Classwork • Q and A • Labs/Projects • IXL • First in Math • TenMarks 	
Summative Assessment: <ul style="list-style-type: none"> • Unit Test 	
Benchmark Assessments: Mid and end of unit teacher-created checkpoints Textbook unit test	
Possible Alternative Assessments: <ul style="list-style-type: none"> • Choice boards - projects • Skit • Demonstration • Journaling • Conferencing 	
Suggested Lesson Plan	
Lessons	Approximate Timeframe
Topic # 1: Review: Characteristics of Quadratic Functions	½ day
Topic # 2: Review: Graphing Quadratic Functions in Standard Form	½ day
Topic # 3: Graphing Quadratic Functions in Intercept Form	2 days
Topic #4: Graphing Quadratic Functions in Vertex Form	2 days
Topic #5: Calculating the Roots of a Quadratic in Vertex Form	1 day
Suggested Lab: Investigation of Transformations w/ Quadratic Functions	2 ½ days
Topic #6: Transformations w/ Quadratic Functions	

Topic # 7: Analyzing the Graphs of Non-Linear Functions	1 day
Topic #8: Comparison of Types of Functions	1 day
Topic # 9: Review and Unit Test	2 days
Curriculum Resources:	
<ul style="list-style-type: none"> ● https://njctl.org/courses/math/algebra-i/ ● https://www.khanacademy.org/ ● Approved Class Text 	
Lesson Components	
<p>21st Century Skills</p> <ul style="list-style-type: none"> ● Financial, Economic, Business, and Entrepreneurial Literacy <p>21st Century Themes</p> <ul style="list-style-type: none"> ● Critical Thinking and Problem Solving ● Communication and Collaboration ● Life and Career Skills 	

Belvidere Cluster Wide Mathematics Curriculum Algebra 1 Unit Plan # 13	
Title: Data & Statistical Analysis	
Subject: Algebra 1	Approximate Time: 2.4 weeks
Unit Summary: The unit introduces the concepts and misconception of statistics. The unit reviews central tendencies and presents ways in which data can be displayed. Misleading graphs will also be examined.	
Learning Targets	
PARCC ■ Major Clusters; ■ Supporting Clusters; ■ Additional Clusters	
Conceptual Category: Statistics Domain: Interpreting Categorical and Quantitative Data	
Cluster: Summarize, represent, and interpret data on a single count or measurement variable	
Standard# :	Standard:
S-ID.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
S-ID.2	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.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
Cluster: Summarize, represent, and interpret data on two categorical and quantitative variables	
Standard# :	Standard:
S-ID.5	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.
Unit Essential Question: <ul style="list-style-type: none"> How can we represent a set of data in a way that tells a story? 	Unit Enduring Understandings: <ul style="list-style-type: none"> Average is the center of the data and can be found with mean, median, and mode. The way data is displayed can either support or refute a point.
Unit Objectives: <ul style="list-style-type: none"> Students will be able to calculate the mean, mode, and median from a set of data. Students will be able to calculate the lower extreme, upper extreme, lower quartile, and upper quartile from a set of data. Students will be able to display data using frequency tables, histograms, stem-and-leaf plots, box-and-whisker plots, and frequency tables. Students will be able to choose a data display. Students will be able to explain why a graph is misleading. 	
Evidence of Learning	
Possible Formative Assessments: <ul style="list-style-type: none"> SMART Response questions used throughout the unit. Quizzes Homework/Classwork Q and A 	

- Labs/Projects
- IXL
- First in Math
- TenMarks

Summative Assessment:

- Unit Test

Benchmark Assessments:

Mid and end of unit teacher-created checkpoints
Textbook unit test

Possible Alternative Assessments:

- Choice boards - projects
- Skit
- Demonstration
- Journaling
- Conferencing

Suggested Lesson Plan

Topics	Approximate Timeframe
Topic #1: Measures of Central Tendency	½ day
Topic #2: Central Tendency Application Problems	½ day
Topic #3: Data Displays: Frequency Tables & Histograms	1 day
Topic #4: Data Displays: Stem and Leaf Plots	1 day
Topic #5: Data Displays: Measures of Dispersion: Box & Whisker Plots	1 day
Topic #6: Review: Two-Way Tables	1 day
Topic #7: Choosing Data Displays	½ day
Topic #8: Misleading Graphs	½ day
Suggested Lab: MARS – The Case of Muddying the Waters	1 day
Topic #9: Review and Unit Test	2 days

Curriculum Resources:

- <https://njctl.org/courses/math/algebra-i/>
- <https://www.khanacademy.org/>
- <http://map.mathshell.org/materials/download.php?fileid=686>
- Approved Class Text

Lesson Components

21st Century Skills

- Financial, Economic, Business, and Entrepreneurial Literacy

21st Century Themes

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Life and Career Skills