STRATFORD PUBLIC SCHOOLS
Stratford, Connecticut

"Tantum eruditi sunt liberi"
Only The Educated Are Free

Algebra 1 Curriculum

Adopted by the Board of Education on June 25, 2012

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DISTRICT MISSION

The mission of the Stratford Public Schools is to develop a community of learners in which students acquire the knowledge, skills and confidence to meet the challenges of a changing and increasingly diverse 21st century society.

DISTRICT CORE VALUES

Students will acquire content knowledge, strengthen higher-order thinking, and develop character in order to address 21st century challenges.

BUNNELL HIGH SCHOOL BELIEFS

We believe teachers must work collaboratively in support of student learning and to model collaboration as a social skill with students. We believe that a rigorous curriculum for all students, an acceptance of diversity, and a culture that actively welcomes all learners will contribute to a more knowledgeable community and society. We believe in the value of a strong education as a means of preparing students for work and life in the remainder of the 21st century.

STRATFORD HIGH SCHOOL BELIEFS

- a safe, positive school climate that embraces diversity is essential to ensure respect and opportunity for each individual
- students should understand the world beyond their community in order to contribute to a global society
- parents and students must share responsibility and work in partnership with the school in order to improve academic performance and to develop lifelong learners
- students should use technology effectively to acquire, process, and deliver information

BUNNELL HIGH SCHOOL and STRATFORD HIGH SCHOOL
LEARNING EXPECTATIONS

All students will…

- use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks. (Academic)
- work independently and collaboratively to solve problems and accomplish goals. (Civic-Social)
- communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. (Academic)
- demonstrate innovation, flexibility and adaptability in thinking patterns, work habits and working/learning conditions. (Academic)
- effectively apply the analysis, synthesis and evaluation processes that enable productive problem solving. (Academic)
- value and demonstrate personal responsibility, character, cultural understanding and ethical behavior. (Civic-Social)
- show competence in all core academic subjects and other fields of interest, including the ability to clearly and effectively communicate content information in multiple formats. (Academic)

ALGEBRA 1 UNIT PLANS # 1 - 9
Stratford Public Schools
Algebra 1 Unit #1

Unit Name: Unit #1 Chapter 1 – Tools of Algebra	Est. # of Weeks: 4 weeks (20 days)

Synopsis: In this chapter, students model relationships using variables, expressions, and equations. They will apply the order of operations to simplify and evaluate expressions with grouping symbols such as parentheses, fraction bars, and absolute value symbols. Operating on real numbers, they evaluate expressions by applying properties, including the Distributive Property, the Commutative and Associative Properties and Identity and Inverse Properties. Finally, students graph points on the coordinate plane and make scatter plots.

STUDENT LEARNING GOALS

Content-Specific Powered Standards
1. Understand that a variety of numerical representations can be used to describe quantitative relationships.
   a. Extend the understanding of number to include integers, rational numbers and real numbers.
   b. Understand that a variety of numerical representations can be used to describe quantitative relationships.
2. Collect, organize and display data using appropriate statistical and graphical methods.
   a. Create the appropriate visual or graphical representation of real data.

21st Century Skills and Expectations Rubric: Critical Skills
1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
2. Work independently and collaboratively to solve problems and accomplish goals.
3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
6. Value and demonstrate personal responsibility, character, cultural understanding and ethical behavior

Interdisciplinary Standards (Technology Integration)
Standard 1: Information Strategies
   Students determine their need for information and apply strategies to select, locate, and access information resources.
Standard 2: Information Use
   Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.
Standard 3: Information and Technology Application
   Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.
Standard 4: Literacy and Literary Appreciation
   Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.
Standard 5: Personal Management
   Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

Key Vocabulary
- **absolute value (p. 20)**
- **coefficient (p. 49)**
- **constant (p. 49)**
- **coordinates (p. 59)**
- **equation (p. 5)**
- **exponent (p. 9)**
- **integers (p. 16)**
- **like terms (p. 49)**
- **ordered pair (p. 59)**
- **order of operations (p. 10)**
- **origin (p. 59)**
- **rational number (p. 17)**
- **real number (p. 18)**
- **reciprocal (p. 41)**
- **variable (p. 4)**

Enduring Understandings	**Essential Questions**
• Students will model relationships using variables, expressions, and equations. • Students will evaluate operations on real numbers using the Distributive, Associative, Commutative, Identity, and Inverse properties. • Students will apply the order of operations to evaluate expressions with grouping symbols. • Students will graph points on the coordinate plane, and make scatter plots.	• How does one translate English phrases into mathematical expressions? • How does one simplify and evaluate expressions with grouping symbols? • How does a scatter plot relate to real-world data?

Learning Objectives / Grade Level Expectations

Students will:

- **use** variables to transform English phrases into mathematical expressions.
- **calculate** with whole numbers, decimals, fractions, and integers.
- **use** order of operations and the distributive property to **simplify** expressions.
- **show** the relationship between two sets of real-world data using a scatter plot.

ASSESSMENT PLAN	
Summative Assessment(s)/Performance Based Assessments including 21ˢᵗ Century Learning	**Formative and Diagnostic Assessment(s)**
• **PBA # 1 Exploring Real Numbers Critical Skills Rubrics #3 and #4** • **PBA #2 Number Trickery Project Critical Skills Rubrics #3 and #4**	• CFA Pre 1a & Post 1b • Diagnostic Test • Verbal assessments • Informal assessments of class work • Weekly quiz • Homework review • Chapter assessment

LEARNING PLAN COMPONENTS
• Prentice Hall Mathematics – Algebra 1 • Supplemental resources • Differentiation of Special Needs students

Unit Name: Unit #2 Chapter 2 – Solving Equations	Est. # of Weeks: 4 weeks (21 days)

Synopsis: Students solve equations, progressing from one-step equations to those that have the variable on both sides. They apply these skills to using formulas and solving literal equations for one of the variables. Students calculate three measures of central tendency, mean, median, and mode, and evaluate which to use as the most representative of a set of date. They also organize data into useful information by making a stem-and-leaf plot.

STUDENT LEARNING GOALS

Content-Specific Powered Standards
1. Understand and describe patterns and functional relationships.
a.   Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions.
2. Represent and analyze quantitative relationships in a variety of ways.
a.   Represent and analyze linear and non-linear functions and relations symbolically and with tables and graphs
b. Represent and analyze quantitative relationships in a variety of ways.
c.   Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations.
3. Develop and apply units, systems, formulas and appropriate tools to estimate and measure.
a.   Solve a variety of problems involving one-, two- and three-dimensional measurements using geometric relationships.

21st Century Skills and Expectations Rubric: Critical Skills
1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
2. Work independently and collaboratively to solve problems and accomplish goals.
3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
6. Value and demonstrate personal responsibility, character, cultural understanding and ethical behavior.

Interdisciplinary Standards (Technology Integration)
Standard 1: Information Strategies
    Students determine their need for information and apply strategies to select, locate, and access information resources.
Standard 2: Information Use
    Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.
Standard 3: Information and Technology Application
    Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.
Standard 4: Literacy and Literary Appreciation
    Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.
Standard 5: Personal Management
    Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

Key Vocabulary
- **consecutive integers (p. 104)**
- **equivalent equations (p. 75)**
- **identity (p. 98)**
- **inverse operations (p. 75)**
- **literal equation (p. 111)**
- **mean (p. 118)**
- **measures of central tendency (p. 118)**
- **median (p. 118)**
- **mode (p. 118)**
- **outlier (p. 118)**
- **range (p. 120)**
- **solution of an equation (p. 75)**
- **uniform motion (p. 104)**

Enduring Understandings	**Essential Questions**
• Solve equations from one-step to those with variables on both sides. • Solve literal equations for one of the variables. • Analyzing and graphing data.	• How are basic concepts and properties of real numbers used to solve an equation? • How do we transform a literal equation? • How does one calculate the mean, median, and mode, and decide which measure of central tendency is the most appropriate?

Learning Objectives / Grade Level Expectations

Students will:

- **solve** equations using the properties of equality.
- **solve** problems by defining variables, relating them to one another, and writing an equation.
- **use** measures of central tendency to describe a set of data.
- **organize** data using a stem-and-leaf plot.

ASSESSMENT PLAN	
Summative Assessment(s)/Performance Based Assessments including 21st Century Learning • **PBA #2 Formulas Project** Critical Skills Rubric #1	**Formative and Diagnostic Assessment(s)** • CFA Pre 2a & Post 2b • Diagnostic Test • Verbal assessments • Informal assessments of class work • Weekly quiz • Homework review • Chapter assessment

LEARNING PLAN COMPONENTS

- Prentice Hall Mathematics – Algebra 1
- Supplemental resources
- Differentiation of Special Needs students

Unit Name: Unit #3 Chapter 4 Solving and Applying Proportions and Chapter 12-8 Counting Methods and Permutations	**Est. # of Weeks:** 3 weeks (15 days)

Synopsis: The characteristics of ratio and proportion are discussed as are methods for solving proportions. The same structure and procedures are applied to a number of different applications. These include using proportions to find dimension for similar figures, solving percent problems, and finding the probability of both simple and compound events.

STUDENT LEARNING GOALS

Content-Specific Powered Standards

1. Use operations, properties and algebraic symbols to determine equivalence and solve problems.
   a. Manipulate equations, inequalities and functions to solve problems.
2. Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.
   a. Develop strategies for computation and estimation using properties of number systems to solve problems.
   b. Solve proportional reasoning problems. Extended: Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.
3. Understand and apply basic concepts of probability.
   a. Understand and apply the principles of probability in a variety of situations.
   b. Understand and apply basic concepts of probability.
   c. Solve problems using the methods of discrete mathematics.
   d. Make statistical inferences through the use of probability.

21ˢᵗ Century Skills and Expectations Rubric: Critical Skills

1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
2. Work independently and collaboratively to solve problems and accomplish goals.
3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Interdisciplinary Standards (Technology Integration)
Standard 1: Information Strategies
   Students determine their need for information and apply strategies to select, locate, and access information resources.
Standard 2: Information Use
   Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.
Standard 3: Information and Technology Application
   Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.
Standard 4: Literacy and Literary Appreciation
   Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.
Standard 5: Personal Management
   Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

Key Vocabulary
- complement of an event (p. 212)
- cross products (p. 183)
- dependent events (p. 221)
- event (p. 211)
- experimental probability (p. 212)
- greatest possible error (p. 205)
- independent events (p. 220)
- outcome (p. 211)
- percent error (p. 206)
- percent of change (p. 204)
- probability (p. 211)
- proportion (p. 183)
- rate (p. 182)
- ratio (p. 182)
- scale (p. 191)
- similar figures (p. 190)
- theoretical probability (p. 211)
- unit analysis (p. 182)
- unit rate (p. 182)

Enduring Understandings	**Essential Questions**
• Students will find ratios and rates, and solve proportions. • Students will apply skills to find dimensions for similar figures, solve percent problems and find the probability of both simple and compound events. • Students will use the multiplication counting principle.	• How does one find ratios and rates? • How does one solve a proportion? • How does one use proportions to find the distance on maps? • How does one use proportions to find the amount of sales tax or percent of increase/decrease? • How does finding the probability of dependent events compared to finding the probability of independent events?

Learning Objectives / Grade Level Expectations

Students will:

- **find** ratios and rates to model real-world situations.
- **use** proportions to measure objects indirectly.
- **solve** problems that involve discounts, taxes, and interest.

ASSESSMENT PLAN

Summative Assessment(s)/Performance Based Assessments including 21st Century Learning	**Formative and Diagnostic Assessment(s)**
	• CFA Pre 3a & Post 3b • Diagnostic Test • Verbal assessments • Informal assessments of class work • Weekly quiz • Homework review • Chapter assessment

LEARNING PLAN COMPONENTS

- Prentice Hall Mathematics – Algebra 1
- Supplemental resources
- Differentiation of Special Needs students

Unit Name: **Unit #4** Chapter 5 Graphs and Functions	Est. # of Weeks: 4 Weeks (22 days)

Synopsis: Students build on their knowledge of equations by relating a graph to the story it tells and to the equation whose solutions it pictures. Students read and use functional notation as they model function rules with tables and graphs. The vocabulary of sequences is introduced. Students find the common difference for an arithmetic sequence and write rules for arithmetic sequences.

STUDENT LEARNING GOALS

Content-Specific Powered Standards	**Interdisciplinary Standards (Technology Integration)**

1.1 Core: Understand and describe patterns and functional relationships.
a. Describe relationships and make generalizations about patterns and functions.
Extended: Understand and describe patterns and functional relationships.
a. Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions.
1.2 Core: Represent and analyze quantitative relationships in a variety of ways.
a. Represent and analyze linear and non-linear functions and relations symbolically and with tables and graphs.
Extended: Represent and analyze quantitative relationships in a variety of ways.
a. Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations.
1.3 Core: Use operations, properties and algebraic symbols to determine equivalence and solve problems.
a. Manipulate equations, inequalities and functions to solve problems
Extended: Use operations, properties and algebraic symbols to determine equivalence and solve problems.
b. Use and extend algebraic concepts to include real and complex numbers, vectors and matrices.
2.1 Core: Understand that a variety of numerical representations can be used to describe quantitative relationships.
a. Interpret and represent large sets of numbers with the aid of technologies.
Extended: Understand that a variety of numerical representations can be used to describe quantitative relationships.
a. Extend the understanding of number to include the set of complex numbers.
2.2 Core: Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.
a. Develop strategies for computation and estimation using properties of number
	Standard 1: Information Strategies
	    Students determine their need for information and apply strategies to select, locate, and access information resources.
	Standard 2: Information Use
	    Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.
	Standard 3: Information and Technology Application
	    Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.
	Standard 4: Literacy and Literary Appreciation
	    Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.
	Standard 5: Personal Management
	    Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.
	
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	Key Vocabulary
	
	• arithmetic sequence (p. 269)
	• common difference (p. 269)
	• conjecture (p. 268)
	• constant of variation (p. 262)
	• dependent variable (p. 248)
	• direct variation (p. 262)
	• domain (p. 241)
	• function (p. 242)
	• function notation (p. 243)
	• function rule (p. 243)
	• independent variable (p. 248)
	• inductive reasoning (p. 268)
	• range (p. 241)
	• relation (p. 241)
	• sequence (p. 269)
	• term (p. 269)
	• vertical-line test (p. 242)

systems to solve problems.
Extended: Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.
a. Investigate mathematical properties and operations related to objects that are not numbers.

4.1 Core: Collect, organize and display data using appropriate statistical and graphical methods.
a.   Create the appropriate visual or graphical representation of real data.
Extended: Collect, organize and display data using appropriate statistical and graphical methods.
a.   Model real data graphically using appropriate tools, technology and strategies.

4.2 Core: Analyze data sets to form hypotheses and make predictions.
a.   Analyze real-world problems using statistical techniques.
Extended: Analyze data sets to form hypotheses and make predictions.
a.   Describe and analyze sets of data using statistical models.

4.3 Core: Understand and apply basic concepts of probability.
a. Understand and apply the principles of probability in a variety of situations.
Extended: Understand and apply basic concepts of probability.
a.   Solve problems using the methods of discrete mathematics.

Enduring Understandings
- Students will relate graphs to events.
- Students will read and use function notation and model function rules with tables and graphs.
- Students will identify direct variation and find constants of variation.

Essential Questions
- How does one relate a graph to the story it tells and to the equation whose solution it pictures?
- How does one read function notation and model data using equations, tables, and graphs?
- How does one use inductive reasoning to recognize number patterns called sequences?

Learning Objectives / Grade Level Expectations
Students will:
- **interpret**, **sketch** and **analyze** graphs from situations.
- **identify** relations and functions.
- **model** functions using rules tables, and graphs.
- **write** a function rule given a table or a real-world situation.
- **write** and solve an equation of a direct variation.

ASSESSMENT PLAN

Summative Assessment(s)/Performance Based Assessments including 21ˢᵗ Century Learning

- **PBA #4 Oil Spill**
  Critical Skills Rubrics #1 and #5

Formative and Diagnostic Assessment(s)
- CFA Pre 4a & Post 4b
- Diagnostic Test
- Verbal assessments
- Informal assessments of class work
- Weekly quiz
- Homework review
- Chapter assessment

LEARNING PLAN COMPONENTS

- Prentice Hall Mathematics – Algebra 1
- Supplemental resources
- Differentiation of Special Needs students

Unit Name: Unit 5: Chapter 6: Linear Equations and their Graphs	Est. # of Weeks: 3 weeks (15 days)

Synopsis: This chapter introduces rates of change and defines slope of a line as the ratio of the vertical change to the horizontal change. This leads to graphing a linear equation and writing the equation of a line in three different forms, using the slope, intercepts, or points on the line. From there, the characteristics of parallel and perpendicular lines are examined. All of these topics are applied together to find trend lines and lines of best fit. Finally, the skills for graphing linear equations are extended to drawing the graph of an absolute value equation.

STUDENT LEARNING GOALS

Content-Specific Powered Standards

1.2
Core: Represent and analyze quantitative relationships in a variety of ways.
a.   Represent and analyze linear and non-linear functions and relations symbolically and with tables and graphs.
Extended: Represent and analyze quantitative relationships in a variety of ways.
a.   Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations.

1.3
Core: Use operations, properties and algebraic symbols to determine equivalence and solve problems.
c.   Manipulate equations, inequalities and functions to solve problems.
Extended: Use operations, properties and algebraic symbols to determine equivalence and solve problems.
a. Use and extend algebraic concepts to include real and complex numbers, vectors and matrices.

2.1
Core: Understand that a variety of numerical representations can be used to describe quantitative relationships.
a. Extend the understanding of number to include integers, rational numbers and real numbers.
b. Interpret and represent large sets of numbers with the aid of technologies.
Extended: Understand that a variety of numerical representations can be used to describe quantitative relationships.
a. Extend the understanding of number to include the set of complex numbers.

4.1
Core: Collect, organize and display data using appropriate statistical and graphical methods.
a. Create the appropriate visual or graphical representation of real data.
Extended: Collect, organize and display

Interdisciplinary Standards (Technology Integration)
Standard 1: Information Strategies
     Students determine their need for information and apply strategies to select, locate, and access information resources.
Standard 2: Information Use
     Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.
Standard 3: Information and Technology Application
     Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.
Standard 4: Literacy and Literary Appreciation
     Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.
Standard 5: Personal Management
     Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

Key Vocabulary
•absolute value equation (p. 325)
•correlation coefficient (p. 319)
•line of best fit (p. 319)
•linear equation (p. 291)
•negative reciprocal (p. 312)
•parallel lines (p. 311)
•perpendicular lines (p. 312)
•point-slope form (p. 304)
•rate of change (p. 282)
•slope (p. 284)
•slope-intercept form (p. 292)
•standard form of a line (p. 298)
•translation (p. 325)
•x-intercept (p. 298)
•y-intercept (p. 291)

data using appropriate statistical and graphical methods.
a. Model real data graphically using appropriate tools, technology and strategies.
4.2
Core: Analyze data sets to form hypotheses and make predictions.
a. Analyze real-world problems using statistical techniques.
Extended: Analyze data sets to form hypotheses and make predictions.
a. Describe and analyze sets of data using statistical models.
4.3
Core: Understand and apply basic concepts of probability.
a. Understand and apply the principles of probability in a variety of situations.
Extended: Understand and apply basic concepts of probability.
a. Solve problems using the methods of discrete mathematics.

21ˢᵗ Century Skills and Expectations
Rubric: Critical Skills
1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
2. Work independently and collaboratively to solve problems and accomplish goals.
3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Enduring Understandings	**Essential Questions**
• Students will write linear equations and recognizing their different forms. • By working with rate of change students will understand how the slope of a line can be interpreted real-world situations. • Students will know the characteristics of parallel a perpendicular lines.	• How does one calculate the rate of change or slope of a linear equation? • How does one transform a linear equation in order to graph using the slope, intercepts, or points on the line? • How does one determine whether the graphs of two linear equations are parallel or perpendicular?

Learning Objectives / Grade Level Expectations
Students will:

- **calculate** the rate of change and slope of a line.
- **graph** and **transform** equations to slope-intercept form, standard form, and point-slope form.
- **determine** whether two lines are parallel or perpendicular.
- **apply** skills to find trend lines and lines of best fit.

ASSESSMENT PLAN	

Summative Assessment(s)/Performance Based Assessments including 21st Century Learning	**Formative and Diagnostic Assessment(s)**
	 CFA
	    • Unit Test
	    • Verbal assessments
	    • Informal assessments of class work
	    • Weekly quiz
	    • Homework review
	    • Chapter assessment

LEARNING PLAN COMPONENTS
  • Prentice Hall Mathematics – Algebra 1   • Supplemental resources   • Differentiation of Special Needs students

Unit Name: UNIT 6: Chapter 8: Exponents and Exponential and Chapter 10	Est. # of Weeks: 3 weeks (15 days)

Synopsis: This chapter introduces using zero and negative exponents, and evaluating exponential equations. Scientific notation illustrates a common use for exponents. Problems using scientific notation and other exponential expressions illustrate multiplying and dividing powers, raising a power to a power, and raising products and quotients to a power. This leads to work with geometric sequences. Then students evaluate and graph exponential functions and apply this to modeling exponential growth and decay.

STUDENT LEARNING GOALS

Content-Specific Powered Standards	Interdisciplinary Standards (Technology Integration)
1.1	**Standard 1: Information Strategies**
Core: Understand and describe patterns and functional relationships.	Students determine their need for information and apply strategies to select, locate, and access information resources.
a. Describe relationships and make generalizations about patterns and functions.	**Standard 2: Information Use**
Extended: Understand and describe patterns and functional relationships.	Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.
a. Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions.	**Standard 3: Information and Technology Application**
1.2	Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.
Core: Represent and analyze quantitative relationships in a variety of ways.	**Standard 4: Literacy and Literary Appreciation**
a. Represent and analyze linear and non-linear functions and relations symbolically and with tables and graphs.	Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.
Extended: Represent and analyze quantitative relationships in a variety of ways.	**Standard 5: Personal Management**
a. Relate the behavior of functions and relati to specific parameters and determine functior model real-world situations	Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.
2.1	
Core: Understand that a variety of numerical representations can be used to describe quantitative relationships.	--
a. Extend the understanding of numbers to include integers, rational numbers and real numbers.	**Key Vocabulary**
Extended: Understand that a variety of numerical representations can be used to describe quantitative relationships.	•common ratio (p. 424) •compound interest (p. 438) •decay factor (p. 440)
a. Extend the understanding of number to include the set of complex numbers.	•exponential decay (p. 440) •exponential function (p. 430) •exponential growth (p. 437)
2.2	•geometric sequence (p. 424) •growth factor (p. 437) •interest period (p. 438)
Core: Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.	•scientific notation (p. 400)
a. Develop strategies for computation and estimation using properties of number system solve problems	
Extended: Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.	

a. Investigate mathematical properties and operations related to objects that are not numbers.

4.1
Core: Collect, organize and display data using appropriate statistical and graphical methods.
a. Create the appropriate visual or graphical representation of real data.
Extended: Collect, organize and display data using appropriate statistical and graphical methods.
a. Model real data graphically using appropriate tools, technology and strategies.

21st Century Skills and Expectations
Rubric: Critical Skills
1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
2. Work independently and collaboratively to solve problems and accomplish goals.
3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Enduring Understandings	**Essential Questions**
Students will simplify and evaluate expressions with zero and negative exponents. Students will know the properties of exponents and scientific notation. Students will evaluate and graph exponential functions.	How does one write numbers using scientific notation? How does one simplify expressions with zero and negative exponents? How does one multiply and divide exponents? How does one evaluate and graph an exponential function? How does one find a square root?

Learning Objectives / Grade Level Expectations
Students will:
- **evaluate** and **simplify** negative and zero exponents.
- **write** numbers using scientific notation.
- **evaluate** and simplify expressions using the properties of exponents.
- **graph** exponential functions by making a table of values.
- **find** square roots.

ASSESSMENT PLAN	
Summative Assessment(s)/Performance Based Assessments including 21st Century Learning	**Formative and Diagnostic Assessment(s)** • CFA • Unit quizzes • Diagnostic Test • Verbal assessments • Informal assessments of class work • Weekly quiz • Homework review • Chapter assessment

LEARNING PLAN COMPONENTS
• Prentice Hall Mathematics – Algebra 1 • Supplemental resources • Differentiation of Special Needs students

Stratford Public Schools
Algebra I Unit #7

Unit Name: UNIT 7: Chapter 7: Systems of Equations and Inequalities	**Est. # of Weeks:** 4 weeks (20 days)

Synopsis: In this chapter, students find the solution of a system of linear equations by graphing. They learn the three possibilities for the solution of a system of two equations: parallel lines, lines that coincide, and lines that intersect. This leads to algebraic methods for solving a system of equations, and then to solving problems by writing a system of linear equations. Graphing linear equations is compared to graphing linear inequalities and solving systems of linear inequalities by graphing.

STUDENT LEARNING GOALS

Content-Specific Powered Standards

1.3

Core: Use operations, properties and algebraic symbols to determine equivalence and solve problems.

d.   Manipulate equations, inequalities and functions to solve problems.

Extended: Use operations, properties and algebraic symbols to determine equivalence and solve problems.

e.   Use and extend algebraic concepts to include real and complex numbers, vectors and matrices.

2.1

Core: Understand that a variety of numerical representations can be used to describe quantitative relationships.

a. Extend the understanding of number to include integers, rational numbers and real numbers.

Extended: Understand that a variety of numerical representations can be used to describe quantitative relation-ships.

a.   Extend the understanding of number to include the set of complex numbers.

2.2 Core:

Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.

a. Develop strategies for computation and estimation using properties of number systems to solve problems.

Extended: Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.

a. Investigate mathematical properties and operations related to objects that are not numbers.

21st Century Skills and Expectations Rubric: Critical Skills

1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.

2. Work independently and collaboratively to solve problems and accomplish goals.

Interdisciplinary Standards (Technology Integration)

Standard 1: Information Strategies

   Students determine their need for information and apply strategies to select, locate, and access information resources.

Standard 2: Information Use

   Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.

Standard 3: Information and Technology Application

   Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.

Standard 4: Literacy and Literary Appreciation

   Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.

Standard 5: Personal Management

   Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

Key Vocabulary

• elimination method (p. 353)
• infinitely many solutions (p. 342)
• linear inequality (p. 371)
• no solution (p. 342)
• solution of a system (p. 340)
• solution of a system of linear inequalities (p. 377)
• solutions of an inequality (p. 371)
• substitution method (p. 347)
• system of linear equations (p. 340)
• system of linear inequalities (p. 377)

3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.	
4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.	
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.	
6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.	

Enduring Understandings	Essential Questions
Students will solve a system of linear equations by graphing. Students will solve a system of linear equations algebraically.	How does one solve a system of two equations with two variables?

Learning Objectives / Grade Level Expectations

Students will:

- **solve** a system of linear equations graphically.
- **solve** a system of linear equations algebraically by the methods of substitution and elimination

ASSESSMENT PLAN	
Summative Assessment(s)/Performance Based Assessments including 21st Century Learning	**Formative and Diagnostic Assessment(s)**
	• CFA
	• Diagnostic Test
	• Verbal assessments
	• Informal assessments of class work
	• Weekly quiz
	• Homework review
	• Chapter assessment

LEARNING PLAN COMPONENTS
• Prentice Hall Mathematics – Algebra 1   • Supplemental resources   • Differentiation of Special Needs students

Unit Name: UNIT 8: Chapter: 9 Polynomials and Factoring	**Est. # of Weeks:** 6 weeks (30 days)

Synopsis: This chapter helps students build knowledge and skills relative to polynomials – the basic building blocks of algebraic expressions. These skills include combining monomials, binomials, and polynomials, using the operations of addition, subtraction, and multiplication. Factoring, the inverse process for multiplying polynomials, is used to factor trinomials, including recognizing certain special patterns and factoring by grouping.

STUDENT LEARNING GOALS

Content-Specific Powered Standards
1.3
Core: Use operations, properties and algebraic symbols to determine equivalence and solve problems.
f.   Manipulate equations, inequalities and functions to solve problems.
Extended: Use operations, properties and algebraic symbols to determine equivalence and solve problems.
a.   Use and extend algebraic concepts to include real and complex numbers, vectors and matrices.
2.2
Core: Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantiti
a.   Solve proportional reasoning problems
Extended: Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.
a. Investigate mathematical properties and operations related to objects that are not numbers.

21st Century Skills and Expectations
Rubric: Critical Skills
1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
2. Work independently and collaboratively to solve problems and accomplish goals.
3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Interdisciplinary Standards (Technology Integration)
Standard 1: Information Strategies
    Students determine their need for information and apply strategies to select, locate, and access information resources.
Standard 2: Information Use
    Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.
Standard 3: Information and Technology Application
    Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.
Standard 4: Literacy and Literary Appreciation
    Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.
Standard 5: Personal Management
    Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

Key Vocabulary

•binomial (p. 457)
•degree of a monomial (p. 457)
•degree of a polynomial (p. 457)
•factor by grouping (p. 496)
•monomial (p. 456)
•perfect-square trinomial (p. 490)
•polynomial (p. 457)
•standard form of a polynomial (p. 457)
•trinomial (p. 457)

Enduring Understandings	Essential Questions
Students will perform basic operations including addition, subtraction, and multiplication on polynomials. Students will factor polynomials.	How does one categorize polynomials? How does one combine monomials, binomials, and polynomials using the operations of addition, subtraction, and multiplication? How does one reverse the process for multiplying polynomials in order to factor?

Learning Objectives / Grade Level Expectations
Students will:

- **add**, **subtract**, and **multiply** polynomials.
- **factor** a monomial from a polynomial.
- **multiply** binomials using FOIL.
- **find** the square of a binomial and **find** the difference of two squares.
- **factor** trinomials.

ASSESSMENT PLAN

Summative Assessment(s)/Performance Based Assessments including 21st Century Learning	Formative and Diagnostic Assessment(s)
	- CFA - Verbal assessments - Informal assessments of class work - Weekly quiz - Homework review - Chapter assessment - Unit Test

LEARNING PLAN COMPONENTS

- Prentice Hall Mathematics – Algebra 1
- Supplemental resources
- Differentiation of Special Needs students

Unit Name: UNIT 9: Chapter 3 Solving Inequalities	Est. # of Weeks: 4 weeks (20 days)

Synopsis: Students extend the skills of the previous chapter, related to solving various kinds of equations, to the solving inequalities. Many of the procedures used are the same, reflecting the fact that the properties for inequalities are very similar to those for equations. Students solve and graph inequalities using addition, subtraction, multiplication, and division, progressing from one-step to multi-step inequalities, first with the variable on one side only, and then with variables on both sides. They also solve compound inequalities as well as equations and inequalities containing absolute value.

STUDENT LEARNING GOALS

Content-Specific Powered Standards

1.1
Core: Understand and describe patterns and functional relationships.
a. Describe relationships and make generalizations about patterns and functions.
Extended: Understand and describe patterns and functional relationships.
a. Model real-world situations and make generalizations about mathematical relationships using a variety of patterns and functions.

1.2
Core: Represent and analyze quantitative relationships in a variety of ways.
a. Represent and analyze linear and non-linear functions and relations symbolically and with tables and graphs.
Extended: Represent and analyze quantitative relationships in a variety of ways.
a. Relate the behavior of functions and relations to specific parameters and determine functions to model real-world situations.

2.1
Core: Understand that a variety of numerical representations can be used to describe quantitative relationships.
a. Extend the understanding of numbers to include integers, rational numbers and real numbers.
Extended: Understand that a variety of numerical representations can be used to describe quantitative relationships.
a. Extend the understanding of number to include the set of complex numbers.

2.2
Core: Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.
a. Develop strategies for computation and estimation us: properties of number systems to solve problems.
Extended: Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.
a. Investigate mathematical properties and operations re to objects that are not numbers.

3.1
Core: Use properties and characteristics of two- and three-dimensional shapes and geometric theorems to describe relationships, communicate ideas and solve problems.
a. Investigate relationships among plane and solid geometric figures using geometric models, constructions and tools.
Extended: Use properties and characteristics of two- and three-dimensional shapes and geometric theorems to describe relationships, communicate ideas and solve problems.
a. Use methods of deductive and inductive reasoning to make, test and validate geometric conjectures.

3.2
Core: Use spatial reasoning, location and

Interdisciplinary Standards (Technology Integration)

Standard 1: Information Strategies
　　Students determine their need for information and apply strategies to select, locate, and access information resources.

Standard 2: Information Use
　　Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.

Standard 3: Information and Technology Application
　　Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.

Standard 4: Literacy and Literary Appreciation
　　Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.

Standard 5: Personal Management
　　Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

Key Vocabulary

•compound inequalities (p. 161)
•equivalent inequalities (p. 140)
•solution of an inequality (p. 134)

geometric relationships to solve problems.
a.   Verify geometric relationships using algebra, coordinate geometry and transformations.
Extended: Use spatial reasoning, location and geometric relationships to solve problems.
a.   Use a variety of coordinate systems and transformations to solve geometric problems in two- and three-dimensions using appropriate tools and technologies.
3.3
Core: Develop and apply units, systems, formulas and appropriate tools to estimate and measure.
a.   Solve a variety of problems involving one-, two- and three-dimensional measurements using geometric relationships and trigonometric ratios.
Extended: Develop and apply units, systems, formulas and appropriate tools to estimate and measure.
a.   Approximate measurements that cannot be directly determined with some degree of precision using appropriate tools, techniques and strategies.
4.1
Core: Collect, organize and display data using appropriate statistical and graphical methods.
a.   Create the appropriate visual or graphical representation of real data.
Extended: Collect, organize and display data using appropriate statistical and graphical methods.
a.   Model real data graphically using appropriate tools, technology and strategies

21st Century Skills and Expectations

Rubric: Critical Skills
1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
2. Work independently and collaboratively to solve problems and accomplish goals.
3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

Enduring Understandings	**Essential Questions**
Students will graph inequalities. Students will relate skills learned for solving equations to the solving of inequalities. Students will write and solve compound inequalities by interpreting phrases that use *and or*, and be able to solve both absolute value equations and inequalities.	What is the difference between solving equations and inequalities? How does one graph an inequality? How does one write and solve compound inequalities? How does one solve and graph equations and inequalities containing absolute value?

Learning Objectives / Grade Level Expectations

Students will:

- **graph** and **solve** inequalities using addition, subtraction, multiplication, and division.
- **solve** compound inequalities.
- **solve** equations and inequalities containing absolute value.

ASSESSMENT PLAN	
Summative Assessment(s)/Performance Based Assessments including 21ˢᵗ Century Learning	**Formative and Diagnostic Assessment(s)** • CFA • Diagnostic Test • Verbal assessments • Informal assessments of class work • Weekly quiz • Homework review • Chapter assessment • Final Exam

LEARNING PLAN COMPONENTS
• Prentice Hall Mathematics – Algebra 1 • Supplemental resources • Differentiation of Special Needs students