<table>
<thead>
<tr>
<th>Grade Level Summary</th>
<th>Unit 7 - Statistics</th>
</tr>
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<tbody>
<tr>
<td>Unit 1 - Operations, Expressions &amp; Equations</td>
<td></td>
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<td>Algebra is one of the broad parts of mathematics, together with number theory, geometry and analysis. In its most general form, algebra is the study of mathematical symbols and the rules for manipulating these symbols; it is a unifying thread of almost all of mathematics. This course will provide practical vocational and technical applications of mathematical concepts with a focus on the skills and concepts of Keystone Algebra. Technical applications and problems presented will be drawn from diverse occupational fields. The two main modules include: 1) Operations with Linear Equations and Inequalities; and 2) Linear Functions and Data Organizations. Upon the completion of this course, students will take the Keystone Algebra I exam.</td>
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<tr>
<td>In this chapter, students will learn how to calculate the measures of central tendency for a set of statistical data. Students will also display data in different formats and analyze trends of data.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit Essential Questions:</th>
<th>Key Understandings:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is the process for finding the measures of central tendency for a set a data?</td>
<td></td>
</tr>
<tr>
<td>2. Which measure of central tendency best describes a particular data set?</td>
<td></td>
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<tr>
<td>3. What information can be interpreted from a scatter plot?</td>
<td></td>
</tr>
<tr>
<td>4. What type of correlation is represented by the data in a scatter plot?</td>
<td></td>
</tr>
<tr>
<td>5. How is the line of best fit for a set of data identified?</td>
<td></td>
</tr>
<tr>
<td>6. What is the process for creating a stem-and-leaf plot?</td>
<td></td>
</tr>
<tr>
<td>7. What information can be interpreted from a stem-and-leaf plot?</td>
<td></td>
</tr>
<tr>
<td>8. How are quartile values for a data set found?</td>
<td></td>
</tr>
<tr>
<td>9. What is the process for creating a box-and-whisker plot?</td>
<td></td>
</tr>
<tr>
<td>1. Find the mode, median, and mean of a set of data.</td>
<td></td>
</tr>
<tr>
<td>2. Determine which measure of central tendency best describes a data set.</td>
<td></td>
</tr>
<tr>
<td>3. Interpret a scatter plot.</td>
<td></td>
</tr>
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<td>4. Identify the correlation of data from a scatter plot.</td>
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<td>8. Calculate quartile values for a data set.</td>
<td></td>
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<tr>
<td>9. Create a box-and-whisker plot.</td>
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Focus Standards Addressed in the Unit:

<table>
<thead>
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<th>Standard Number</th>
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<tbody>
<tr>
<td>CC.2.4.HS.B.1</td>
<td>Summarize, represent, and interpret data on a single count or measurement variable.</td>
</tr>
<tr>
<td>CC.2.4.HS.B.2</td>
<td>Summarize, represent, and interpret data on two categorical and quantitative variables.</td>
</tr>
<tr>
<td>CC.2.4.HS.B.3</td>
<td>Analyze linear models to make interpretations based on the data.</td>
</tr>
<tr>
<td>CC.2.1.HS.F.3</td>
<td>Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.</td>
</tr>
</tbody>
</table>

Important Standards Addressed in the Unit:

| CC.2.2.HS.C.6 | Interpret functions in terms of the situations they model. |

Misconceptions:

- The median of a set of data is always the middle number. The middle may not be in the data set.
- There can only be one mode of a data set.
- The line of best fit must pass through all the data points.
- Each tick mark on the axis of the graph represents one unit.
- Stems and leaves are both single digit values in a stem-and-leaf plot.
- A key is not that important to a stem-and-leaf plot.
- When creating a box-and-whisker plot the whiskers should be of uniform length. Likewise, the distance between quartiles should appear equal in size.

Proper Conceptions:

- The median of an odd number of data values is the middle number, but the median of an even number of data values is the average of the two middle values. The median need not correspond to any number in the data set.
- There can be one mode, multiple modes, or no mode for a set of data. When a data set does not have a mode, the student should write “no mode” or “zero mode”. Putting the number 0 implies that the number zero is the mode.
- The line of best fit may not always fit the data well. If the points are tightly clustered around the line of best fit, then the equation of the line provides a good description of the behavior of the data.
- The axes of graphs can be scaled a variety of ways. It is important to read the labels on the axis of graphs carefully to fully understand the scale of the graph.
- Stems can be multiple digits in a stem-and-leaf plot but leaves are single digits.
- A key is critical to understanding how to read a stem-and-leaf plot.
- 100% of the data is represented in a box-and-whisker plot. It is broken down into quartiles with 25% of the data values between each of the quartiles. Therefore, the size of the whiskers may be of different lengths and/or the median may appear closer to one side of the box than the other. It is about the percent of the data, not what the data values are.

Knowledge & Concepts

- Measures of Central Tendency
- Scatter Plots, Correlation, and Lines of Best Fit
- Stem-and-Leaf Plots
- Quartiles and Box-and-Whisker Plots

Skills & Competencies

- Find the mode, median, and mean of a set of data.
- Determine which measures of central tendency best describes a data set for given situations.
- Interpret a scatter plot.
- Identify the correlation of data from a scatter plot.

Dispositions & Practices

- Using questioning techniques to encourage creativity, openness to new ideas and concepts, curiosity for new learning, and innovative problem solving skills.
- Using discussion to develop strong communication skills and meaningful interactions.
Identify the line of best fit for a set of data.
Create a stem-and-leaf plot.
Interpret a stem-and-leaf plot.
Calculate quartile values for a data set.
Create a box-and-whisker plot.

Instructional materials and activities to allow students to engage in critical thinking and collaborate effectively.

Daily informal assessments of student understanding to provide students with the opportunity to fail forward and learn from mistakes, be resilient, persevere, and adapt their mindset with the intent to grow and develop as a learner.

Activities and instructional materials to support literacy in mathematics, reading and writing as well as explore post-secondary career options.

Classroom environment that supports well-rounded life-long learners with traits such as self-directed, responsible, self-disciplined and self-motivated. This environment also harbors compassionate and empathetic individuals and shows the importance of civic engagement.

Academic Vocabulary:
- Box-and-whisker plot
- Leaves
- Median
- Negative Correlation
- Positive Correlation
- Regression Line
- Stems
- Correlation Coefficient
- Line of Best Fit
- Median-Fit Method
- No Correlation
- Quartiles
- Scatter Plot
- Key
- Mean
- Mode
- Outliers
- Range
- Stem-and-Leaf Plot

Evidence: Assessments and Performance Task(s)
- **Homework** - Students will be required to show work which reinforces classroom concepts. Homework will be evaluated primarily on completion and used as a formative assessment tool.
- **Notes Check** - Students will maintain a set of foldables and/or graphic organizers aligned to learning outcomes. They will be evaluated for completeness and the ability to use such materials on class assignments.
- **Quizzes** - Within each unit, competencies will be assessed in smaller chunks as a grade for the purpose of evaluating student understanding.
- **Unit Test** - Each unit will include a summative written test.
- **Unit Project** - Each unit will include a project and/or real-world application that reinforces the importance of the content.

Interdisciplinary Connections:
- Statistics can help students manage information and expand career options in the following fields:
  - Stock Analysts use statistics to report on investments options to assist clients in making informed decisions on how to invest their money.
  - Coaches utilize statistics when they gather data about players to determine strategic plays, player and team rankings, draft picks, and contract salaries.
  - Business Owners use statistics when creating a business plan and when making critical decisions about their businesses.
  - Clothing Buyers depend on statistics to determine consumer trends and make profitable decisions about future trends.
Educators employ statistics to determine the success of their students and to relay that information to the public through displays and reports.

**Additional Resources:**
- Khan Academy
- USA Test Prep
- Textbook Ancillary Materials
- Online Textbook Materials

**Created By:**
Kathleen Nichols
Aimee Eshleman
Robert Bleiler
Sara Keeny
Algebra 1 - Learning in Context
Grade 9
Unit 1

Course/Subject: Algebra 1 Learning In Context
Grade: 9
Suggested Timeline: 17 Days

Grade Level Summary

Unit 7 - Statistics
Unit 1 - Operations, Expressions & Equations
Unit 3 - Solving Equations
Unit 10 - Polynomials & Factors
Unit 6 - Probability
Unit 4 - Linear Equations
Unit 5 - Nonlinear Functions
Unit 8 - Systems of Equations
Unit 9 - Inequalities
Unit 2 - Measurement

Grade Level Units

Algebra is one of the broad parts of mathematics, together with number theory, geometry and analysis. In its most general form, algebra is the study of mathematical symbols and the rules for manipulating these symbols; it is a unifying thread of almost all of mathematics. This course will provide practical vocational and technical applications of mathematical concepts with a focus on the skills and concepts of Keystone Algebra. Technical applications and problems presented will be drawn from diverse occupational fields. The two main modules include: 1) Operations with Linear Equations and Inequalities; and 2) Linear Functions and Data Organizations. Upon the completion of this course, students will take the Keystone Algebra I exam.

Unit Title
Chapter 1 - Operations, Expressions & Equations

Unit Summary
In this chapter, students will learn the basics of algebra computation. Students will learn how to find absolute value, use operations with real numbers, write expressions containing unknown values and evaluate formulas.

Unit Essential Questions:
1. How can numbers be classified?
2. How can numbers be ordered from least to greatest?
3. What patterns can be found in sequences?
4. How can students identify and continue arithmetic and geometric sequences?
5. How can real numbers be compared?
6. How can absolute value expressions be evaluated?
7. How are real numbers added with the same sign and with different signs?
8. How are real numbers subtracted with the same sign and with different signs?
9. How are real numbers multiplied with the same sign and with different signs?
10. How are real numbers divided with the same sign and with different signs?

Key Understandings:
1. Classify numbers.
2. Order numbers from least to greatest.
3. Find patterns in sequences.
4. Identify and continue arithmetic and geometric sequences.
5. Compare real numbers.
6. Evaluate absolute value expressions.
7. Add real numbers with the same sign and with different signs.
8. Subtract real numbers with the same sign and with different signs.
9. Multiply real numbers with the same sign and with different signs.
10. Divide real numbers with the same sign and with different signs.
11. How are numerical and algebraic expressions evaluated?
12. In what ways can word phrases and algebraic expressions be translated?
13. How are formulas used to find missing values?
14. How are formulas used to find simple interest and compound interest?

11. Evaluate numerical and algebraic expressions using order of operations.
12. Translate between word phrases and algebraic expressions.
13. Use formulas to find missing values.
14. Use formulas to find simple interest and compound interest.

Focus Standards Addressed in the Unit:

<table>
<thead>
<tr>
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<tr>
<td>CC.2.1.HS.F.2</td>
<td>Apply properties of rational and irrational numbers to solve real world or mathematical problems.</td>
</tr>
<tr>
<td>CC.2.2.HS.C.3</td>
<td>Write functions or sequences that model relationships between two quantities.</td>
</tr>
<tr>
<td>CC.2.2.HS.D.1</td>
<td>Interpret the structure of expressions to represent a quantity in terms of its context.</td>
</tr>
<tr>
<td>CC.2.2.HS.C.6</td>
<td>Interpret functions in terms of the situations they model.</td>
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Important Standards Addressed in the Unit:

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<td>Summarize, represent, and interpret data on two categorical and quantitative variables.</td>
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<td>CC.2.2.HS.D.2</td>
<td>Write expressions in equivalent forms to solve problems.</td>
</tr>
<tr>
<td>CC.2.2.HS.D.9</td>
<td>Use reasoning to solve equations and justify the solution method.</td>
</tr>
<tr>
<td>CC.2.2.HS.D.10</td>
<td>Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.</td>
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Misconceptions:
- The names of different types of numbers are unimportant.
- It doesn’t really matter whether a sequence is arithmetic or geometric.
- A greater than symbol is a less than symbol.
- The larger the negative number, the larger the number is.
- The absolute value of a positive number is negative.
- The rules for multiplying and dividing real numbers are the same as the rules for adding and subtracting.
- A negative number added to a negative number is a positive number.
- Expressions are simplified left to right.
- Units are not very important when using formulas.

Proper Conceptions:
- It is helpful to know the names of different numbers when learning to apply different properties of numbers.
- An arithmetic sequence involves a common difference between each term and a geometric sequence involves a common quotient between terms.
- The small end of the symbol should be next to the smaller number and the large end should be next to the larger number. When the less than sign is opened up, it looks like the letter “L” for less than.
- Plotting values on a number line makes it easier to compare negative numbers. The larger the negative number the smaller the number is because it is further from zero.
- Many students confuse the fact that absolute value of a number must always be positive with the fact that the opposite of a number can be either positive or negative.
- The rules for dividing signed real numbers are the same as the ones for multiplying signed real numbers. These rules are not the same as adding and subtracting real numbers.
- Expressions are simplified by following order of operations. Parenteses, Exponents, Multiply or Divide (whichever comes first left to right), then Add or Subtract (whichever comes first left to right)
- When substituting values into a formula, students should include units. The units will simplify, leaving the final solution in terms of the proper unit. If the unit does not
correspond to what the student is solving for, there was either a substitution or calculation error.

### Knowledge & Concepts
- Set of Real Numbers
- Sequences
- Absolute Value
- Adding & Subtracting Real Numbers
- Multiplying & Dividing Real Numbers
- Variables and Expressions
- Equations and Formulas

### Skills & Competencies
- Classify numbers.
- Order numbers from least to greatest.
- Find patterns of sequences.
- Identify and continue arithmetic and geometric sequences.
- Compare real numbers.
- Evaluate absolute value expressions.
- Add real numbers with the same sign and with different signs.
- Subtract real numbers with the same sign and with different signs.
- Multiply real numbers with the same sign and with different signs.
- Divide real numbers with the same sign and with different signs.
- Evaluate numerical and algebraic expressions using order of operations.
- Translate between word phrases and algebraic expressions.
- Use formulas to find missing values.
- Use formulas to find simple interest and compound interest.

### Dispositions & Practices
- Using questioning techniques to encourage creativity, openness to new ideas and concepts, curiosity for new learning, and innovative problem solving skills.
- Using discussion to develop strong communication skills and meaningful interactions.
- Instructional materials and activities to allow students to engage in critical thinking and collaborate effectively.
- Daily informal assessments of student understanding to provide students with the opportunity to fail forward and learn from mistakes, be resilient, persevere, and adapt their mindset with the intent to grow and develop as a learner.
- Activities and instructional materials to support literacy in mathematics, reading and writing as well as explore post-secondary career options.
- Classroom environment that supports well-rounded life-long learners with traits such as self-directed, responsible, self-disciplined and self-motivated. This environment also harbors compassionate and empathetic individuals and shows the importance of civic engagement.

### Academic Vocabulary:
- Absolute Value
- Coefficient
- Equation
- Integers
- Irrational Numbers
- Numerical Expression
- Origin
- Rate of Interest
- Sequence
- Total Amount
- Algebraic Expression
- Compound Interest
- Formula
- Interest
- Natural Numbers
- Opposite
- Principal
- Rational Numbers
- Simple Interest
- Variable
- Arithmetic Sequence
- Constant
- Geometric Sequence
- Inverse Operations
- Number Line
- Order of Operations
- Quadrants
- Real Numbers
- Terms
- Unit
- Whole Numbers

### Evidence: Assessments and Performance Task(s)
- **Homework** - Students will be required to show work which reinforces classroom concepts. Homework will be evaluated primarily on completion and used as a formative assessment tool.
• **Notes Check** - Students will maintain a set of foldables and/or graphic organizers aligned to learning outcomes. They will be evaluated for completeness and the ability to use such materials on class assignments.
• **Quizzes** - Within each unit, competencies will be assessed in smaller chunks as a grade for the purpose of evaluating student understanding.
• **Unit Test** - Each unit will include a summative written test.
• **Unit Project** - Each unit will include a project and/or real-world application that reinforces the importance of the content.

### Interdisciplinary Connections:
- As technology has become a major part of our everyday lives, these skills are in ever increasing demand in the following careers:
  - Accountants use real numbers to follow and report upon the earning and expenses for a company or individual.
  - Cartographers create topographic maps using contour lines with intervals and real numbers that describe the terrain.
  - Opticians use real numbers to classify the curvature of the optical lenses.
  - Dietitians use formulas to establish and balance nutritional amounts.

### Additional Resources:
- Khan Academy
- USA Test Prep
- Textbook Ancillary Materials
- Online Textbook Materials

### Created By:
Kathleen Nichols
Aimee Eshleman
Robert Bleiler
Sara Keeny
Grade Level Summary

Unit 7 - Statistics
Unit 1 - Operations, Expressions & Equations

**Unit 3 - Solving Equations**
Unit 10 - Polynomials & Factors
Unit 6 - Probability
Unit 4 - Linear Equations
Unit 5 - Nonlinear Functions
Unit 8 - Systems of Equations
Unit 9 - Inequalities
Unit 2 - Measurement

Grade Level Units

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**Unit Title** Chapter 3 - Solving Equations

**Unit Summary**

In this chapter, students will learn how to simplify and solve equations. Students will learn how to convert a problem into an equation and how to check the solution of an equation in terms of the problem. This chapter is the foundation of algebra. Without full comprehension on how to solve and equation, a student cannot succeed in algebra. It is imperative that students learn the process of solving an equation and show all steps. They should be able to verbally explain the process as well.

**Unit Essential Questions:**
1. What is the process for solving multiplication and division equations?
2. Can formulas be rearranged to solve for a given variable?
3. How are cross-products used to solve proportions?
4. How are proportions and percent equations used to solve percent problems?
5. What is the process to solving addition and subtraction equations?
6. What combination of properties, including the distributive property, can be used to solve equations?
7. How are equations solved with variables on both sides?

**Key Understandings:**
1. Solve multiplication and division equations.
2. Apply inverse operations to solve for a given variable.
3. Use cross-products to solve proportions.
4. Use proportions and percent equations to solve percent problems.
5. Solve addition and subtraction equations.
6. Use a combination of properties, including the distributive property, to solve equations.
7. Solve equations with variables on both sides.
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Important Standards Addressed in the Unit:

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<td>CC.2.1.HS.F.2</td>
<td>Apply properties of rational and irrational numbers to solve real world or mathematical problems.</td>
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Misconceptions:
- To solve an equation move all terms to the same side of the equation.
- If the equation can be solved mentally there is no need to show any steps.
- Checking a solution to an equation is not important.
- When setting up a proportion it doesn’t really matter how the ratios are set up.
- Any terms in an equation can be combined.

Proper Conceptions:
- To solve an equation the goal is to isolate the variable.
- Eventually students will have to solve equations with many steps so showing the steps will prepare students for equations to come. Showing steps will also help to determine where errors were made.
- It is important to check solutions to equations so that when an error occurs, it can be fixed.
- When writing proportions to solve problems, the numerators must have the same units and the denominators must have the same units.
- Only like terms in an equation can be combined. That is, terms with the same variable and same exponent.

Knowledge & Concepts

- Properties of Multiplication and Division
- Solving Proportions and Percent Equations
- Properties of Addition and Subtraction
- Multi-Step Equations
- Equations with Variables on Both Sides

Skills & Competencies

- Solve multiplication and division equations.
- Use inverse operations to solve a formula for a given variable.
- Use cross-product to solve proportions.
- Use proportions and percent equations to solve percent equations.
- Solve addition and subtraction equations.
- Use a combination of properties, including the distributive property to solve equations.
- Solve equations with variable terms on both sides.

Dispositions & Practices

- Using questioning techniques to encourage creativity, openness to new ideas and concepts, curiosity for new learning, and innovative problem solving skills.
- Using discussion to develop strong communication skills and meaningful interactions.
- Instructional materials and activities to allow students to engage in critical thinking and collaborate effectively.
- Daily informal assessments of student understanding to provide students with the opportunity to fail forward and learn from mistakes, be resilient, persevere, and adapt their mindset with the intent to grow and develop as a learner.
Activities and instructional materials to support literacy in mathematics, reading and writing as well as explore post-secondary career options.

Classroom environment that supports well-rounded life-long learners with traits such as self-directed, responsible, self-disciplined and self-motivated. This environment also harbors compassionate and empathetic individuals and shows the importance of civic engagement.

Academic Vocabulary:

- Cross-multiplying
- Means
- Proportion
- Extremes
- Multiplicative Inverses
- Reciprocal
- Like Terms
- Percent
- Ratio

Evidence: Assessments and Performance Task(s)

- **Homework** - Students will be required to show work which reinforces classroom concepts. Homework will be evaluated primarily on completion and used as a formative assessment tool.
- **Notes Check** - Students will maintain a set of foldables and/or graphic organizers aligned to learning outcomes. They will be evaluated for completeness and the ability to use such materials on class assignments.
- **Quizzes** - Within each unit, competencies will be assessed in smaller chunks as a grade for the purpose of evaluating student understanding.
- **Unit Test** - Each unit will include a summative written test.
- **Unit Project** - Each unit will include a project and/or real-world application that reinforces the importance of the content.

Interdisciplinary Connections:

- Learning to use equations can effectively prepare students for the following careers:
  - Business Owners use equations to determine the development and manufacturing cost of the product, decide what price to sell the product, and calculate how much of the product should be sold to get the desired profit.
  - Scientists write and solve equations to mix solutions and create compounds of the correct concentration.
  - Farmers use equations to determine the price for which to sell their crops.
  - Mechanical Engineers write and solve equations in the design and manufacturing of machinery.
  - Registered Nurses use equations to determine flow rates for intravenous fluids.

Additional Resources:

- Khan Academy
- USA Test Prep
- Textbook Ancillary Materials
- Online Textbook Materials

Created By:
Kathleen Nichols
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Algebra 1 - Learning in Context  
Grade 9  
Unit 10

<table>
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<tr>
<th>Course/Subject: Algebra 1 Learning In Context</th>
<th>Grade: 9</th>
<th>Suggested Timeline: 20 Days</th>
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**Grade Level Summary**

Unit 7 - Statistics  
Unit 1 - Operations, Expressions & Equations  
Unit 3 - Solving Equations  
**Unit 10 - Polynomials & Factors**  
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**Grade Level Units**

Algebra is one of the broad parts of mathematics, together with number theory, geometry and analysis. In its most general form, algebra is the study of mathematical symbols and the rules for manipulating these symbols; it is a unifying thread of almost all of mathematics. This course will provide practical vocational and technical applications of mathematical concepts with a focus on the skills and concepts of Keystone Algebra. Technical applications and problems presented will be drawn from diverse occupational fields. The two main modules include: 1) Operations with Linear Equations and Inequalities; and 2) Linear Functions and Data Organizations. Upon the completion of this course, students will take the Keystone Algebra I exam.

**Unit Title**

Chapter 10 - Polynomials & Factors

**Unit Summary**

In this chapter, students will be presented with main ideas involving monomials and polynomials. Students will learn how to find the product of two binomials, learn how to factor any trinomial and practice solving problems that contain factoring. Factoring is a very important skill that helps students realize patterns and develop logical order skills.

**Unit Essential Questions:**

1. How do students classify polynomials?
2. How do students use algebra tiles to add polynomials?
3. How do students add and subtract polynomials?
4. How do students find the greatest common factor of two monomials?
5. How do students use the product of powers property and the quotient of powers properties to simplify expressions?
6. How do students use the properties of exponents to simplify expressions?
7. How do students use algebra tiles and geometric representations to multiply two binomials?
8. How do students use the FOIL method to multiply two binomials?
9. How do students use algebra tiles to factor trinomials?

**Key Understandings:**

1. Classify polynomials.
2. Use algebra tiles to add polynomials.
3. Add and subtract polynomials.
4. Find the greatest common factor of two monomials.
5. Use the product of powers property and the quotient of powers properties to simplify expressions.
6. Use the properties of exponents to simplify expressions.
7. Use algebra tiles and geometric representations to multiply two binomials.
8. Use the FOIL method to multiply two binomials.
9. Use algebra tiles to factor trinomials.
10. Factor trinomials in the form $x^2 + bx + c$ and $ax^2 + bx + c$.
11. Factor the difference of two squares.
12. Factor perfect square trinomials.
10. How do students factor trinomials in the form \(x^2 + bx + c\) and \(ax^2 + bx + c\)?

11. How do students factor the difference of two squares?

12. How do students factor perfect square trinomials?

13. How do students factor polynomial expressions completely?

14. How do students use factoring by grouping to factor polynomial expressions?

13. Factor polynomial expressions completely.

14. Use factoring by grouping to factor polynomial expressions.

Focus Standards Addressed in the Unit:

<table>
<thead>
<tr>
<th>Standard Number</th>
<th>Standard Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC.2.2.HS.D.2</td>
<td>Write expressions in equivalent forms to solve problems.</td>
</tr>
<tr>
<td>CC.2.2.HS.D.3</td>
<td>Extend the knowledge of arithmetic operations and apply to polynomials.</td>
</tr>
</tbody>
</table>

Important Standards Addressed in the Unit:

| CC.2.2.HS.D.1   | Interpret the structure of expressions to represent a quantity in terms of its context. |

Misconceptions:

- When adding/subtracting polynomials all terms of the polynomial can be combined together despite the exponents.
- When adding/subtracting polynomials, the exponents are also added/subtracted.
- The degree of a polynomial is the sum of the exponents.
- Only like terms of polynomials can be multiplied together.
- When multiplying to simplify exponential expressions the exponents of like terms are multiplied.
- When dividing to simplify exponential expressions the exponents of like terms are divided.
- Anything raised to the zero power equals zero.
- Anything divided by zeros is zero.
- Negative exponents result in negative solutions.
- Every polynomial is factorable.
- There is only one correct order to write the factors of a polynomial.
- Squaring a binomial involves raising each individual value to the given power resulting in a binomial solution.

Proper Conceptions:

- When adding/subtracting polynomials, only like terms can be combined.
- When adding/subtracting polynomials exponents are not added or subtracted. The exponents stay the same.
- The degree of a polynomial is the largest monomial exponent.
- Any terms of a polynomial can be multiplied together, they do not have to be like terms to multiply.
- When multiplying to simplify exponential expressions the exponents of like terms are added together.
- When dividing to simplify exponential expressions the exponents of like terms are subtracted.
- Anything raised to the zeros power equals 1.
- You cannot divide by zero.
- Negative exponents have nothing to do with the sign of the solution.
- Not all polynomials can be factored
- The order of the factors of a polynomial makes no difference
- When squaring a binomial the solution will be a trinomial.

<table>
<thead>
<tr>
<th>Knowledge &amp; Concepts</th>
<th>Skills &amp; Competencies</th>
<th>Dispositions &amp; Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polynomials</td>
<td>Classify polynomials.</td>
<td></td>
</tr>
<tr>
<td>Monomial Factors</td>
<td>Use algebra tiles to add polynomials.</td>
<td></td>
</tr>
<tr>
<td>Properties of Exponents</td>
<td>Add and subtract polynomials.</td>
<td></td>
</tr>
<tr>
<td>Multiplying Binomials</td>
<td>Using questioning techniques to encourage creativity, openness to new ideas and concepts, curiosity for new</td>
<td></td>
</tr>
</tbody>
</table>
• Factoring Trinomials
• Special Products and Factors
• Factoring Techniques

Find the greatest common factor of two numbers.

Use the Project of Powers Property and the Quotient of Powers Properties to simplify expressions.

Use the properties of exponents to simplify expressions.

Use the FOIL method to multiply two binomials.

Use geometric representations to multiply two binomials.

Use algebra tiles to factor trinomials.

Factor trinomials in the form \( x^2 + bx + c \) and \( ax^2 + bx + c \).

Factor the difference of two squares.

Factor perfect square trinomials.

Use factoring by grouping to factor polynomials.

Factor a polynomial expression completely.

learning, and innovative problem solving skills.

Using discussion to develop strong communication skills and meaningful interactions.

Instructional materials and activities to allow students to engage in critical thinking and collaborate effectively.

Daily informal assessments of student understanding to provide students with the opportunity to fail forward and learn from mistakes, be resilient, persevere, and adapt their mindset with the intent to grow and develop as a learner.

Activities and instructional materials to support literacy in mathematics, reading and writing as well as explore post-secondary career options.

Classroom environment that supports well-rounded life-long learners with traits such as self-directed, responsible, self-disciplined and self-motivated. This environment also harbors compassionate and empathetic individuals and shows the importance of civic engagement.

Academic Vocabulary:

• Binomial Square
• Monomial
• Special Product

• Degree
• Perfect Square Trinomial
• Twin Primes

• Like Terms
• Polynomials

Evidence: Assessments and Performance Task(s)

• **Homework** - Students will be required to show work which reinforces classroom concepts. Homework will be evaluated primarily on completion and used as a formative assessment tool.

• **Notes Check** - Students will maintain a set of foldables and/or graphic organizers aligned to learning outcomes. They will be evaluated for completeness and the ability to use such materials on class assignments.

• **Quizzes** - Within each unit, competencies will be assessed in smaller chunks as a grade for the purpose of evaluating student understanding.

• **Unit Test** - Each unit will include a summative written test.

• **Unit Project** - Each unit will include a project and/or real-world application that reinforces the importance of the content.

Interdisciplinary Connections:

• Effective problem-solving abilities, like the ones stressed in this chapter, are essential in the workplace.
  
  ○ Package Designers use polynomials to determine how to construct a package with the desired dimensions and capacity.
  
  ○ Electronic Engineers design the optimum shape of a satellite dish that will collect signals using quadratic polynomial expressions.
  
  ○ Fabric Designers construct their patterns and materials requirements by utilizing polynomial expressions and their factors.
  
  ○ Architects use polynomials when adjusting blueprints to fulfill builder requirements.
Forest Rangers utilize polynomials to determine the size of trees from aerial photography in order to estimate the age of forests.

**Additional Resources:**
- Khan Academy
- USA Test Prep
- Textbook Ancillary Materials
- Online Textbook Materials

**Created By:**
Kathleen Nichols
Aimee Eshleman
Robert Bleiler
Sara Keeny
Unit Title

Chapter 6 - Probability

Unit Summary

In this chapter, students will learn how to calculate the likelihood of an event occurring. Students will explore both dependent and independent events, as well as exclusive and compound events. Students will compare experimental and theoretical probabilities, as well as compare and contrast various sampling techniques.

Unit Essential Questions:

1. How can the theoretical probability of an event be calculated?
2. How can the probability of the complement of an event be calculated?
3. How can the experimental probability of an event be determined?
4. How can probabilities be used to make predictions?
5. How can a sample space be used to find the total number of possible outcomes for an event?
6. How can the Addition Principle of Counting be used when computing probability of mutually exclusive events?
7. How can the probability of mutually exclusive events be calculated?

Key Understandings:

1. Calculate the theoretical probability of an event.
2. Calculate the probability of the complement of an event.
3. Determine the experimental probability of an event.
4. Make a prediction based on the probability of an event.
5. Use a sample space to find the total number of possible outcomes for an event.
6. Use the Addition Principle of Counting when computing probability of mutually exclusive events.
7. Calculate the probability of mutually exclusive events.
8. Use the Fundamental Counting Principle to determine total number of possible outcomes.
9. Calculate the probability of independent events.
10. Calculate the probability of dependent events.
11. Identify types of sampling.
8. How can the Fundamental Counting Principle be used to determine the total number of possible outcomes?
9. How can the probability of independent events be calculated?
10. How can the probability of dependent events be calculated?
11. How are types of sampling identified?
12. How can samples be used to make predictions?

Focus Standards Addressed in the Unit:

<table>
<thead>
<tr>
<th>Standard Number</th>
<th>Standard Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC.2.4.HS.B.4</td>
<td>Recognize and evaluate random processes underlying statistical experiments.</td>
</tr>
<tr>
<td>CC.2.4.HS.B.5</td>
<td>Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.</td>
</tr>
<tr>
<td>CC.2.4.HS.B.6</td>
<td>Use the concepts of independence and conditional probability to interpret data.</td>
</tr>
<tr>
<td>CC.2.4.HS.B.7</td>
<td>Apply the rules of probability to compute probabilities of compound events in a uniform probability model.</td>
</tr>
</tbody>
</table>

Important Standards Addressed in the Unit:

<table>
<thead>
<tr>
<th>Standard Number</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CC.2.4.HS.B.1</td>
<td>Summarize, represent, and interpret data on a single count or measurement variable.</td>
</tr>
</tbody>
</table>

Misconceptions:
- Probability of an event can be larger than one.
- Probability and odds of an event are the same thing.
- There is no difference between experimental and theoretical probability.
- All events are mutually exclusive.
- The words and and or can be interchanged in finding probabilities.
- An event is independent if the outcome of the first event impacts the outcome of the second event.

Proper Conceptions:
- Probability of an event must be between zero and one inclusive. A percent, decimal, or fraction may be used to represent the probability.
- Probability is the number of favorable outcomes compared to the total possible outcomes whereas odds is the number of favorable outcomes compared to the number of unfavorable outcomes.
- Experimental probability is useful as a tool for predicting outcomes when all possible events are not random. It is the number of times the event occurs experimentally divided by the total number of trials. Theoretical probability is the number of favorable outcomes possible divided by the total number of outcomes possible.
- If two events cannot occur at the same time, the events are mutually exclusive.
- The word and means that both events will occur. The word or means at least one of the events will occur.
- An event is independent (with replacement) if the probability of the event occurring is not affected by the outcome of a previous event. An event is dependent (without replacement) if the probability of the event occurring is affected by the outcome of a previous event.
<table>
<thead>
<tr>
<th>Knowledge &amp; Concepts</th>
<th>Skills &amp; Competencies</th>
<th>Dispositions &amp; Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Probability</td>
<td>• Calculate the theoretical probability of an event.</td>
<td>• Using questioning techniques to encourage creativity, openness to new ideas and concepts, curiosity for new learning, and innovative problem solving skills.</td>
</tr>
<tr>
<td>• Experimental Probability</td>
<td>• Calculate the probability of the complement of an event.</td>
<td>• Using discussion to develop strong communication skills and meaningful interactions.</td>
</tr>
<tr>
<td>• Addition Principle of Counting</td>
<td>• Determine the experimental probability of an event.</td>
<td>• Instructional materials and activities to allow students to engage in critical thinking and collaborate effectively.</td>
</tr>
<tr>
<td>• Fundamental Counting Principle</td>
<td>• Make a prediction based on the probability of an event.</td>
<td>• Daily informal assessments of student understanding to provide students with the opportunity to fail forward and learn from mistakes, be resilient, persevere, and adapt their mindset with the intent to grow and develop as a learner.</td>
</tr>
<tr>
<td>• Independent and Dependent Events</td>
<td>• Use a sample space to find the total number of possible outcomes of an event.</td>
<td>• Activities and instructional materials to support literacy in mathematics, reading and writing as well as explore post-secondary career options.</td>
</tr>
<tr>
<td>• Populations and Sampling</td>
<td>• Use the Addition Principle of Counting when computing probability.</td>
<td>• Classroom environment that supports well-rounded life-long learners with traits such as self-directed, responsible, self-disciplined and self-motivated. This environment also harbors compassionate and empathetic individuals and shows the importance of civic engagement.</td>
</tr>
</tbody>
</table>

**Academic Vocabulary:**
- Complement
- Dependent
- Experimental probability
- Favorable outcome
- Fundamental Counting Principle
- Independent
- Inferential statistics
- Mutually exclusive
- Odds
- Outcomes
- Parameters
- Population
- Probability sample
- Random numbers
- Random Sampling
- Sample
- Sample Space
- Sampling error
- Simulation
- Stratified Sampling
- Systematic Sampling
- Tree Diagram

**Evidence: Assessments and Performance Task(s)**
- **Homework** - Students will be required to show work which reinforces classroom concepts. Homework will be evaluated primarily on completion and used as a formative assessment tool.
- **Notes Check** - Students will maintain a set of foldables and/or graphic organizers aligned to learning outcomes. They will be evaluated for completeness and the ability to use such materials on class assignments.
- **Quizzes** - Within each unit, competencies will be assessed in smaller chunks as a grade for the purpose of evaluating student understanding.
- **Unit Test** - Each unit will include a summative written test.
Unit Project - Each unit will include a project and/or real-world application that reinforces the importance of the content.

Interdisciplinary Connections:
- In certain careers, the principles of probability can help you manage information and expand your options.
  - Political Analysts and Strategists use probability and sampling to forecast winners in elections.
  - Marketers utilize probability to make decisions on how to increase sales.
  - Day Traders use probability to determine what stocks to buy or sell and when to buy or sell them.
  - Meteorologists apply probability to assist in weather forecasts.
  - Scientists use sampling to describe and predict random processes.
  - Risk Analysts utilize probability when creating risk tables for specific events.

Additional Resources:
- Khan Academy
- USA Test Prep
- Textbook Ancillary Materials
- Online Textbook Materials

Created By:
Kathleen Nichols
Aimee Eshleman
Robert Bleiler
Sara Keeny
Grade Level Summary

- Unit 7 - Statistics
- Unit 1 - Operations, Expressions & Equations
- Unit 3 - Solving Equations
- Unit 10 - Polynomials & Factors
- Unit 6 - Probability

**Unit 4 - Linear Equations**

- Unit 5 - Nonlinear Functions
- Unit 8 - Systems of Equations
- Unit 9 - Inequalities
- Unit 2 - Measurement

Grade Level Units

Algebra is one of the broad parts of mathematics, together with number theory, geometry and analysis. In its most general form, algebra is the study of mathematical symbols and the rules for manipulating these symbols; it is a unifying thread of almost all of mathematics. This course will provide practical vocational and technical applications of mathematical concepts with a focus on the skills and concepts of Keystone Algebra. Technical applications and problems presented will be drawn from diverse occupational fields. The two main modules include: 1) Operations with Linear Equations and Inequalities; and 2) Linear Functions and Data Organizations. Upon the completion of this course, students will take the Keystone Algebra I exam.

Unit Title

Chapter 4 - Linear Equations

Unit Summary

In this chapter, students will learn the various traits of graphs and functions. Students will learn how to write and graph linear equations. Students will also find the slope and intercepts of a graphed line and find equations for parallel and perpendicular lines. Lastly, students will explore the effects on the graph of a linear equation when the slope and the intercepts are adjusted.

Unit Essential Questions:

1. How can ordered pairs on a Cartesian coordinate system be identified?
2. How can midpoints on a Cartesian coordinate system be found?
3. How can the slope of a line be found graphically?
4. How can the slope of a line be found algebraically?
5. How can linear equations be graphed?
6. How can the slope and y-intercept of linear equations be identified?
7. What is the process for writing a linear equations given a slope and y-intercept, a slope and a point, or a graph?
8. How can the intercepts of linear functions be found?

Key Understandings:

1. Identify ordered pairs on a Cartesian coordinate system.
2. Find midpoints on a Cartesian coordinate system.
3. Find the slope of a line from the graph of the line.
4. Find the slope of a line given two points on the line by using the formula for slope.
5. Graph linear equations.
6. Identify the slope and y-intercept of linear equations.
7. Write linear equations given a slope and y-intercept, a slope and a point, or a graph.
8. Find the intercepts of linear functions.
9. Find and graph the equation of a line given two points.
10. Determine if two lines are parallel or perpendicular.
11. Write equations of parallel and perpendicular lines.
9. What is the process for finding and graphing the equation of a line given two points?
10. What is the process for determining if two lines are parallel or perpendicular?
11. What is the process for writing equations of parallel and perpendicular lines?

Focus Standards Addressed in the Unit:

<table>
<thead>
<tr>
<th>Standard Number</th>
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</thead>
<tbody>
<tr>
<td>CC.2.2.HS.D.7</td>
<td>Create and graph equations or inequalities to describe numbers or relationships.</td>
</tr>
<tr>
<td>CC.2.2.HS.D.10</td>
<td>Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.</td>
</tr>
<tr>
<td>CC.2.2.HS.C.2</td>
<td>Graph and analyze functions and use their properties to make connections between the different representations.</td>
</tr>
<tr>
<td>CC.2.2.HS.C.3</td>
<td>Write functions or sequences that model relationships between two quantities.</td>
</tr>
<tr>
<td>CC.2.2.HS.C.5</td>
<td>Construct and compare linear, quadratic, and exponential models to solve problems.</td>
</tr>
<tr>
<td>CC.2.2.HS.C.6</td>
<td>Interpret functions in terms of the situations they model.</td>
</tr>
</tbody>
</table>

Important Standards Addressed in the Unit:

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<tbody>
<tr>
<td>CC.2.1.HS.F.2</td>
<td>Apply properties of rational and irrational numbers to solve real world or mathematical problems.</td>
</tr>
<tr>
<td>CC.2.2.HS.D.8</td>
<td>Apply inverse operations to solve equations or formulas for a given variable.</td>
</tr>
<tr>
<td>CC.2.4.HS.B.1</td>
<td>Summarize, represent, and interpret data on a single count or measurement variable.</td>
</tr>
</tbody>
</table>

Misconceptions:
- Ordered pairs are plotted by rise over run.
- Quadrants are identified in a clockwise direction beginning in upper left quadrant.
- Slope is determined by reading the graph right to left.
- A vertical line has zero slope.
- The only way to find the slope of a line is to graph the line.
- When using the slope formula, the order in which you substitute in two points is irrelevant.
- The only way to graph a line is to make a table of values.
- Perpendicular lines have opposite slopes.
- The only way to tell if two lines are parallel or perpendicular is to graph them.

Proper Conceptions:
- Plotting points is left/right movement before up/down movement. Slope is up/down movement (rise) before left/right movement (run).
- The four quadrants are named in the counterclockwise direction beginning in the upper right hand quadrant.
- Slope is determined by reading a graph left to right. Uphill is positive, downhill is negative.
- A vertical line has no slope and a horizontal line has zero slope.
- The slope formula can be used to determine the slope of a line.
- The order in which the y-coordinates are subtracted must be the same as the order in which the x-coordinates are subtracted.
- When graphing linear equations, remind students that they have many options in doing so. They can make a table and connect the points from the table. They can plot a point and count up and over using the slope. They can use a graphing calculator too.
- Perpendicular lines have negative reciprocal slopes.
- Looking at the equations of lines is a way to determine if two lines are parallel or perpendicular. Parallel lines have the...
same slope and perpendicular lines have negative reciprocal slopes.

<table>
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</thead>
<tbody>
<tr>
<td>● Coordinates and Graphs</td>
<td>● Identify ordered pairs on a Cartesian coordinate system.</td>
<td>● Using questioning techniques to encourage creativity, openness to new ideas and concepts, curiosity for new learning, and innovative problem solving skills.</td>
</tr>
<tr>
<td>● Slope of a Line</td>
<td>● Choose an appropriate range and scale for the Cartesian coordinate system.</td>
<td>● Using discussion to develop strong communication skills and meaningful interactions.</td>
</tr>
<tr>
<td>● Graphing Linear Equations</td>
<td>● Find the midpoint of a pair of ordered pairs.</td>
<td>● Instructional materials and activities to allow students to engage in critical thinking and collaborate effectively.</td>
</tr>
<tr>
<td>● Writing Linear Equations</td>
<td>● Find the slope of a line from the graph of a line.</td>
<td>● Daily informal assessments of student understanding to provide students with the opportunity to fail forward and learn from mistakes, be resilient, persevere, and adapt their mindset with the intent to grow and develop as a learner.</td>
</tr>
<tr>
<td>● Linear Functions</td>
<td>● Find the slope of a line given two points on the line.</td>
<td>● Activities and instructional materials to support literacy in mathematics, reading and writing as well as explore post-secondary career options.</td>
</tr>
<tr>
<td>● Slopes of Parallel and Perpendicular Lines</td>
<td>● Graph linear equations.</td>
<td>● Classroom environment that supports well-rounded life-long learners with traits such as self-directed, responsible, self-disciplined and self-motivated. This environment also harbors compassionate and empathetic individuals and shows the importance of civic engagement.</td>
</tr>
<tr>
<td></td>
<td>● Identify the slope and y-intercepts of linear equations.</td>
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<tr>
<td></td>
<td>● Write linear equations given a slope and y-intercept, a slope and a point, or a graph.</td>
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<tr>
<td></td>
<td>● Find the intercepts of linear functions.</td>
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<td>● Find and graph the equation of a line given two points.</td>
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<td>● Determine if two lines are parallel or perpendicular.</td>
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<td>● Write equations of parallel and perpendicular lines.</td>
<td></td>
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</tbody>
</table>

**Academic Vocabulary:**

- Cartesian coordinate system
- Dependent
- Dependent variable
- Independent variable
- Independent
- Linear equations
- Negative reciprocal
- Ordered pair
- Origin
- Parallel lines
- Perpendicular line
- Plane
- Slope
- Slope-Intercept form
- X-axis
- X-coordinate
- Y-axis
- Y-coordinate
- Y-intercept
- Zero

**Evidence: Assessments and Performance Task(s)**

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- **Unit Project** - Each unit will include a project and/or real-world application that reinforces the importance of the content.

**Interdisciplinary Connections:**
- Successful problem solvers in business, manufacturing, engineering, and other industries often use linear equations. The skill of determining the right solution will make you invaluable to your employer.
  - Consumer Advocates write and solve linear equations to determine which products and services will help consumers get the most for their money.
  - Chemists write and solve linear equations to find out how the inclusion of certain chemicals affect their experiments.
  - Mechanical Engineers use linear equations to calculate the amount of materials needed to produce a certain number of designs.
  - Loan Officers use linear equations to determine past and future loan payments.
  - Contractors write and solve linear equations to find out how much materials are necessary to do a job.

**Additional Resources:**
- Khan Academy
- USA Test Prep
- Textbook Ancillary Materials
- Online Textbook Materials

**Created By:**
Kathleen Nichols
Aimee Eshleman
Robert Bleiler
Sara Keeny
<table>
<thead>
<tr>
<th>Course/Subject: Algebra 1 Learning In Context</th>
<th>Grade: 9</th>
<th>Suggested Timeline: 8 Days</th>
</tr>
</thead>
</table>

### Grade Level Summary
- Unit 7 - Statistics
- Unit 1 - Operations, Expressions & Equations
- Unit 3 - Solving Equations
- Unit 10 - Polynomials & Factors
- Unit 6 - Probability
- Unit 4 - Linear Equations
- **Unit 5 - Nonlinear Functions**
- Unit 8 - Systems of Equations
- Unit 9 - Inequalities
- Unit 2 - Measurement

### Grade Level Units
Algebra is one of the broad parts of mathematics, together with number theory, geometry and analysis. In its most general form, algebra is the study of mathematical symbols and the rules for manipulating these symbols; it is a unifying thread of almost all of mathematics. This course will provide practical vocational and technical applications of mathematical concepts with a focus on the skills and concepts of Keystone Algebra. Technical applications and problems presented will be drawn from diverse occupational fields. The two main modules include: 1) Operations with Linear Equations and Inequalities; and 2) Linear Functions and Data Organizations. Upon the completion of this course, students will take the Keystone Algebra I exam.

### Unit Title
Chapter 5 - Nonlinear Functions.

### Unit Summary
In this chapter, students will study relationships using sets of ordered pairs, tables, graphs, and equations to represent both linear and nonlinear relationships. Students will also be exposed to square roots and the Pythagorean Theorem.

### Unit Essential Questions:
1. How can the domain and range of a relation be identified?
2. What is the process for writing a rule for a sequence of numbers?
3. What determines if a relation is a function?
4. How are functions evaluated?
5. What determines if a function is linear or nonlinear?
6. How can the square root of a number be approximated?
7. How can equations involving square roots be solved?
8. How can the Pythagorean Theorem be used to find missing dimensions of a right triangle?

### Key Understandings:
1. Identify the domain and range of a relation.
2. Write a rule for a sequence of numbers.
3. Determine if a relation is a function.
4. Evaluate functions.
5. Determine if a function is linear or nonlinear.
6. Approximate the square root of a number.
7. Solve equations involving square roots.
8. Use the Pythagorean Theorem to find missing dimensions of a right triangle.
Focus Standards Addressed in the Unit:

<table>
<thead>
<tr>
<th>Standard Number</th>
<th>Standard Description</th>
</tr>
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<tbody>
<tr>
<td>CC.2.2.HS.C.1</td>
<td>Use the concepts and notation of functions to interpret and apply them in terms of their context.</td>
</tr>
<tr>
<td>CC.2.2.HS.C.3</td>
<td>Write functions or sequences that model relationships between two quantities.</td>
</tr>
<tr>
<td>CC.2.2.HS.C.6</td>
<td>Interpret functions in terms of the situations they model.</td>
</tr>
<tr>
<td>CC.2.3.HS.A.3</td>
<td>Verify and apply geometric theorems as they relate to geometric figures.</td>
</tr>
<tr>
<td>CC.2.3.HS.A.14</td>
<td>Apply geometric concepts to model and solve real world problems.</td>
</tr>
<tr>
<td>CC.2.1.HS.F.2</td>
<td>Apply properties of rational and irrational numbers to solve real world or mathematical problems.</td>
</tr>
</tbody>
</table>

Important Standards Addressed in the Unit:

<table>
<thead>
<tr>
<th>Standard Number</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CC.2.2.HS.C.2</td>
<td>Graph and analyze functions and use their properties to make connections between the different representations.</td>
</tr>
<tr>
<td>CC.2.1.HS.F.3</td>
<td>Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.</td>
</tr>
</tbody>
</table>

Misconceptions:

- All relations are functions.
- The range of a function is the x-values.
- The vertical line test is used to determine if a function is a relation.
- Square roots can only be simplified on the calculator.
- When using the Pythagorean Theorem, it doesn’t really matter which side is “c”.

Proper Conceptions:

- All functions are relations, but not all relations are functions. A function is a set of ordered pairs such that for any value of x, there is exactly one value of y. A relation is a set of ordered pairs.
- The domain of a function is the x-values and the range is the y-values.
- The vertical line test is used to determine if a relation is a function.
- Exact solutions to square roots can be found by looking for perfect squares or by making factor trees.
- When using the Pythagorean Theorem the hypotenuse is always “c”.

Knowledge & Concepts

- Relations & Functions
- Evaluating Functions
- Functions Involving Square Roots

Skills & Competencies

- Identify the domain and range of a relation.
- Write a rule for a sequence of numbers.
- Determine if a relation is a function.
- Evaluate functions.
- Determine if a function is linear or nonlinear.
- Approximate the square roots of a number.
- Solve equations involving square roots.
- Use the Pythagorean Theorem to find missing dimensions of a right triangle.

Dispositions & Practices

- Using questioning techniques to encourage creativity, openness to new ideas and concepts, curiosity for new learning, and innovative problem solving skills.
- Using discussion to develop strong communication skills and meaningful interactions.
- Instructional materials and activities to allow students to engage in critical thinking and collaborate effectively.
- Daily informal assessments of student understanding to provide students with the opportunity to fail forward.
and learn from mistakes, be resilient, persevere, and adapt their mindset with the intent to grow and develop as a learner.

- Activities and instructional materials to support literacy in mathematics, reading and writing as well as explore post-secondary career options.
- Classroom environment that supports well-rounded life-long learners with traits such as self-directed, responsible, self-disciplined and self-motivated. This environment also harbors compassionate and empathetic individuals and shows the importance of civic engagement.

### Academic Vocabulary:

<table>
<thead>
<tr>
<th>● Function</th>
<th>● Evaluate a function</th>
<th>● Pythagorean Theorem</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Range</td>
<td>● Nonlinear function</td>
<td>● Right Triangle</td>
</tr>
<tr>
<td>● Composite function</td>
<td>● Perfect squares</td>
<td></td>
</tr>
</tbody>
</table>

### Evidence: Assessments and Performance Task(s)

- **Homework** - Students will be required to show work which reinforces classroom concepts. Homework will be evaluated primarily on completion and used as a formative assessment tool.
- **Notes Check** - Students will maintain a set of foldables and/or graphic organizers aligned to learning outcomes. They will be evaluated for completeness and the ability to use such materials on class assignments.
- **Quizzes** - Within each unit, competencies will be assessed in smaller chunks as a grade for the purpose of evaluating student understanding.
- **Unit Test** - Each unit will include a summative written test.
- **Unit Project** - Each unit will include a project and/or real-world application that reinforces the importance of the content.

### Interdisciplinary Connections:

- Nonlinear mathematical models are used in industry to design new products that will advance technology and improve our lives.
  - Structural Engineers model the motion of bridges with nonlinear functions.
  - Financial Advisors use nonlinear functions to project the future earnings of clients’ accounts.
  - Automobile Engineers apply nonlinear functions when designing electric cars.
  - Electrical Engineers use nonlinear functions when designing electrical devices.

### Additional Resources:

- Khan Academy
- USA Test Prep
- Textbook Ancillary Materials
- Online Textbook Materials

### Created By:

Kathleen Nichols  
Aimee Eshleman  
Robert Bleiler  
Sara Keeny
## Grade Level Summary

- Unit 7 - Statistics
- Unit 1 - Operations, Expressions & Equations
- Unit 3 - Solving Equations
- Unit 10 - Polynomials & Factors
- Unit 6 - Probability
- Unit 4 - Linear Equations
- Unit 5 - Nonlinear Functions
**Unit 8 - Systems of Equations of Equations**
- Unit 9 - Inequalities
- Unit 2 - Measurement

## Grade Level Units

Algebra is one of the broad parts of mathematics, together with number theory, geometry and analysis. In its most general form, algebra is the study of mathematical symbols and the rules for manipulating these symbols; it is a unifying thread of almost all of mathematics. This course will provide practical vocational and technical applications of mathematical concepts with a focus on the skills and concepts of Keystone Algebra. Technical applications and problems presented will be drawn from diverse occupational fields. The two main modules include: 1) Operations with Linear Equations and Inequalities; and 2) Linear Functions and Data Organizations. Upon the completion of this course, students will take the Keystone Algebra I exam.

## Unit Title

**Chapter 8 - Systems of Equations**

## Unit Summary

In this chapter, students will learn how to write and solve systems of equations. Students will have two simultaneous equations to solve. The questions may have one solution, infinite solutions, or no solutions. A variety of ways to solve these systems will be presented.

## Unit Essential Questions:

1. How can systems of linear equations be solved graphically?
2. How can systems of linear equations be solved using a table?
3. What is the process for determining whether systems of equations are consistent or inconsistent?
4. What is the process for determining whether systems of equations are dependent or independent?
5. How can systems of linear equations be solved by substitution?
6. How can systems of linear equations be solved by addition or subtraction?
7. How can systems of linear equations be solved by multiplication?

## Key Understandings:

1. Solve systems of linear equations graphically.
2. Solve systems of linear equations using a table.
3. Determine whether systems of equations are consistent or inconsistent.
4. Determine whether systems of equations are dependent or independent.
5. Solve systems of linear equations by substitution.
6. Solve systems of linear equations by addition or subtraction.
7. Solve systems of linear equations by multiplication.
**Focus Standards Addressed in the Unit:**

<table>
<thead>
<tr>
<th>Standard Number</th>
<th>Standard Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC.2.2.HS.D.10</td>
<td>Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.</td>
</tr>
<tr>
<td>CC.2.2.HS.C.3</td>
<td>Write functions or sequences that model relationships between two quantities.</td>
</tr>
<tr>
<td>CC.2.2.HS.C.6</td>
<td>Interpret functions in terms of the situations they model.</td>
</tr>
</tbody>
</table>

**Important Standards Addressed in the Unit:**

| CC.2.1.HS.F.3   | Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. |
| CC.2.2.HS.D.2   | Write expressions in equivalent forms to solve problems. |
| CC.2.2.HS.D.7   | Create and graph equations or inequalities to describe numbers or relationships. |
| CC.2.2.HS.D.8   | Apply inverse operations to solve equations or formulas for a given variable. |
| CC.2.2.HS.D.9   | Use reasoning to solve equations and justify the solution method. |
| CC.2.3.HS.A.14  | Apply geometric concepts to model and solve real world problems. |

**Misconceptions:**
- The only way to solve a system of linear equations is to graph it.
- There is exactly one solution to a system of linear equations.
- Two lines always intersect in one point.
- To prove there is no solution that satisfies both equations, try all possible ordered pairs.
- When solving a system of linear equations using substitution, it matters which variable is solved for first.
- When solving a system of linear equations using elimination, the two equations do not need to be in the same form.
- Stop at the equal sign when multiplying an equation by a value that eliminates the variable when solving a system of linear equations using the elimination method.
- Variables must have the same coefficients to eliminate them when solving a system of linear equations using the elimination method.
- Solutions to a system of linear equations will vary depending on which method is used.

**Proper Conceptions:**
- Unless using a graphing utility, it isn’t always practical to graph a system of linear equations to solve it. Therefore, there are two other methods: substitution and elimination.
- There is either one solution, infinite solutions, or no solution when solving a system of linear equations.
- Two lines may intersect, but they may also be parallel or coinciding.
- It is not possible to try all ordered pairs to prove there is no solution that satisfies both equations, since there are an infinite number of ordered pairs to try. To prove the equations are inconsistent is to prove the lines are parallel.
- When solving by substitution, it is possible to solve for either of the variables. To avoid fractions, it is easiest to solve for a variable that has a coefficient of one. If there is more than one variable with a coefficient of one, or if none of the variables has a coefficient of one, then the system can be solved multiple ways.
- While not absolutely necessary to do, it certainly aids the process of using the elimination method if the two equations are in the same form.
- Multiply the entire equation by a number when solving a system of equations by elimination. Do not stop at the equal sign. This makes the equation unbalanced, and no longer the same equation.
- Variables being eliminated must have opposite coefficients when solving a system of linear equations using the elimination method.
- No matter which method is used to solve a system of equations, the solutions are all still the same.
<table>
<thead>
<tr>
<th>Knowledge &amp; Concepts</th>
<th>Skills &amp; Competencies</th>
<th>Dispositions &amp; Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Solving a Linear System by Graphing</td>
<td>• Solve a system of linear equations graphically</td>
<td>• Using questioning techniques to encourage creativity, openness to new ideas and concepts, curiosity for new learning, and innovative problem solving skills.</td>
</tr>
<tr>
<td>• Special Linear Systems</td>
<td>• Solve a system of linear equations using a table</td>
<td>• Using discussion to develop strong communication skills and meaningful interactions.</td>
</tr>
<tr>
<td>• Solving Systems by Substitution</td>
<td>• Determine whether systems of equations are consistent or inconsistent</td>
<td>• Instructional materials and activities to allow students to engage in critical thinking and collaborate effectively.</td>
</tr>
<tr>
<td>• Solving Systems by Addition or Subtraction</td>
<td>• Determine whether systems of equations are dependent or independent</td>
<td>• Daily informal assessments of student understanding to provide students with the opportunity to fail forward and learn from mistakes, be resilient, persevere, and adapt their mindset with the intent to grow and develop as a learner.</td>
</tr>
<tr>
<td>• Solving Systems by Multiplication</td>
<td>• Solve a system of equations using substitution</td>
<td>• Activities and instructional materials to support literacy in mathematics, reading and writing as well as explore post-secondary career options.</td>
</tr>
<tr>
<td></td>
<td>• Solve a system of equations using either addition or subtraction</td>
<td>• Classroom environment that supports well-rounded life-long learners with traits such as self-directed, responsible, self-disciplined and self-motivated. This environment also harbors compassionate and empathetic individuals and shows the importance of civic engagement.</td>
</tr>
<tr>
<td></td>
<td>• Solve a system of linear equations using the multiplication method</td>
<td></td>
</tr>
</tbody>
</table>

**Academic Vocabulary:**
- Break-even point
- Consistent
- Dependent
- Elimination
- Independent
- Substitution
- System of linear equations
- Inconsistent
- Independent

**Evidence: Assessments and Performance Task(s)**
- **Homework** - Students will be required to show work which reinforces classroom concepts. Homework will be evaluated primarily on completion and used as a formative assessment tool.
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- **Unit Test** - Each unit will include a summative written test.
- **Unit Project** - Each unit will include a project and/or real-world application that reinforces the importance of the content.
Interdisciplinary Connections:
- In today’s highly competitive world, businesses are constantly looking for solutions that will reduce costs and conserve resources. Highly skilled problem-solvers use tools such as systems of equations to find optimal solutions.
  - Scientists write and solve systems of equations to determine how one set of conditions in an experiment or in the environment affects an outcome.
  - Business Owners use systems of equations to determine the cost of products or services they sell and to find break-even points when revenue equals or exceeds those costs.
  - Pharmacists use systems of equations to mix prescriptions to the appropriate strength.
  - Bank Officers utilize systems of equations to establish the cost differences in payment plans.
  - Consumer Advocates write and solve systems of equations to figure out which companies offer a better value.

Additional Resources:
- Khan Academy
- USA Test Prep
- Textbook Ancillary Materials
- Online Textbook Materials

Created By:
Kathleen Nichols
Aimee Eshleman
Robert Bleiler
Sara Keeny
Algebra 1 - Learning in Context
Grade 9
Unit 9

| Course/Subject: Algebra 1 Learning In Context | Grade: 9 | Suggested Timeline: 21 Days |

### Grade Level Summary
- Unit 7 - Statistics
- Unit 1 - Operations, Expressions & Equations
- Unit 3 - Solving Equations
- Unit 10 - Polynomials & Factors
- Unit 6 - Probability
- Unit 4 - Linear Equations
- Unit 5 - Nonlinear Functions
- Unit 8 - Systems of Equations
- **Unit 9 - Inequalities**
- Unit 2 - Measurement

### Grade Level Units
Algebra is one of the broad parts of mathematics, together with number theory, geometry and analysis. In its most general form, algebra is the study of mathematical symbols and the rules for manipulating these symbols; it is a unifying thread of almost all of mathematics. This course will provide practical vocational and technical applications of mathematical concepts with a focus on the skills and concepts of Keystone Algebra. Technical applications and problems presented will be drawn from diverse occupational fields. The two main modules include: 1) Operations with Linear Equations and Inequalities; and 2) Linear Functions and Data Organizations. Upon the completion of this course, students will take the Keystone Algebra I exam.

### Unit Title
- Chapter 9 - Inequalities

### Unit Summary
In this chapter, students will learn how to solve and graph linear inequalities. When needing to provide a range of values for an answer set, inequalities are useful. Students will express answers both as solution sets and on a graph. Students will use linear programing to find solutions for real-life situations.

### Unit Essential Questions:
1. How can inequalities on a number line be identified and graphed?
2. How are inequalities solved and graphed by using addition and subtraction?
3. How are inequalities solved and graphed by using multiplication and division?
4. How are compound inequalities solved or graphed?
5. How are absolute value inequalities solved or graphed?
6. What is the process for graphing linear inequalities with two variables?
7. What is the process for writing linear inequalities to represent situations?
8. How can systems of linear inequalities be solved?

### Key Understandings:
1. Identify and graph inequalities on a number line.
2. Use addition and subtraction to solve and graph inequalities.
3. Use multiplication and division to solve and graph inequalities.
4. Solve and graph compound inequalities.
5. Solve and graph absolute value inequalities.
6. Graph linear inequalities with two variables.
7. Write linear inequalities to represent situations.
8. Solve systems of linear inequalities.
Focus Standards Addressed in the Unit:

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<thead>
<tr>
<th>Standard Number</th>
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<tbody>
<tr>
<td>CC.2.2.HS.D.7</td>
<td>Create and graph equations or inequalities to describe numbers or relationships.</td>
</tr>
<tr>
<td>CC.2.2.HS.D.10</td>
<td>Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.</td>
</tr>
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<td>CC.2.2.HS.C.3</td>
<td>Write functions or sequences that model relationships between two quantities.</td>
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<td>Interpret functions in terms of the situations they model.</td>
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<td>Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.</td>
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<td>CC.2.2.HS.D.2</td>
<td>Write expressions in equivalent forms to solve problems.</td>
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<tr>
<td>CC.2.3.HS.A.14</td>
<td>Apply geometric concepts to model and solve real world problems.</td>
</tr>
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Misconceptions:

- There is a single number solution for each inequality.
- There is no need to write the inequality symbol as a part of the solution.
- “At least” means the solution set is less than and “at most” means the solution set is greater than.
- When the isolated variable in an inequality is on the right side of the statement, the solutions set is in the direction that the inequality sign is pointing.
- Closed dots are used on all points on a number line contained within a solution set as well as all boundary points.
- Whichever direction the inequality symbol points in the problem being solved, is the same direction the inequality sign points in the solution.
- There really is no difference between an “and” and an “or” inequality.
- The steps for solving a conjunction are the same as the steps for solving a disjunction.
- When solving an absolute value inequality, there is always one solution set.
- All absolute value inequalities have solutions.
- It is possible to list all solutions to a system of linear inequalities.
- Shading the solution to a system of linear inequalities is not necessary.
- Solid lines are used to connect all points on the boundary of the solution set.

Proper Conceptions:

- There is a range of values for an inequality. Answers are shown both as solution sets and on a graph.
- In order to obtain the complete solution to an inequality it is imperative to bring down the inequality symbol in each step of the solution.
- “At least” translates to “greater than or equal to” and “at most” translates to “less than or equal to”.
- If the isolated variable in an inequality statement is on the left side of the statement, the solution set is in the direction that the inequality sign is pointing. If the isolated variable is on the right side of the inequality statement, the solution set is in the opposite direction that the inequality sign is pointing.
- Closed dots are used on all points on a number line contained within a solution set but not always with the boundary points. It depends if the boundary point is a part of the solution set.
- When multiplying or dividing by a negative value on both sides of the inequality statement, the inequality symbol must be reversed.
- A conjunction uses the word “and”; a disjunction uses the word “or”. Furthermore, the solution of a conjunction satisfies both sides of the “and” statement. The solution of a disjunction satisfies one or both sides of the “or” statement.
- Both a disjunction and a conjunction are solved algebraically, and in both one variable is isolated. For a conjunction, the variable is typically between two endpoints, while a
disjunction is two separate statements with the variable isolated on one side in each.
- When solving an absolute value inequality, there are always two inequalities to consider because an absolute value inequality is a compound inequality. If the inequality specifies a distance from zero less than some constant, it is a conjunction; if it specifies a distance from zero greater than some constant, it is a disjunction.
- There is no absolute value less than or equal to a negative number; in fact; an absolute value is always zero or greater since it is a distance.
- A graph must be shown when solving a system of inequalities since there are too many solution to list.
- When graphing inequalities, shading is used to identify the region containing all of the points whose coordinates make the inequality true.
- The line is dashed if the inequality is less than or greater than. It is a solid line if the inequality is greater than or equal to or less than or equal to.

<table>
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</table>
| ● Inequalities and the Number Line  
● The Addition Property of Inequality  
● The Multiplication Property of Inequality  
● Solving Compound Inequalities  
● Solving Absolute Value Inequalities  
● Graphing Linear Inequalities in Two Variables  
● Solving Systems of Inequalities | ● Identify and graph inequalities on a number line  
● Use addition and subtraction to solve and graph inequalities  
● Use multiplication and division to solve and graph inequalities  
● Solve and graph compound inequalities  
● Solve and graph absolute value inequalities  
● Graph linear inequalities in two variables  
● Write linear inequalities to represent situations  
● Solve systems of linear inequalities | ● Using questioning techniques to encourage creativity, openness to new ideas and concepts, curiosity for new learning, and innovative problem solving skills.  
● Using discussion to develop strong communication skills and meaningful interactions.  
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● Daily informal assessments of student understanding to provide students with the opportunity to fail forward and learn from mistakes, be resilient, persevere, and adapt their mindset with the intent to grow and develop as a learner.  
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Interdisciplinary Connections:
- Inequalities are applied in industries that include business, sales, and science.
  - Farmers use inequalities to find which mix of crops will maximize profits.
  - Store managers utilize inequalities to determine store inventory while staying within constraints for budget and storeroom space.
  - Service Technicians use inequalities to make decisions on materials to purchase and to give accurate estimates.
  - Retail Purchasers decide what quantities of products to purchase to remain within financial confines.
  - Financial Managers use inequalities to determine the appropriate mix of investments in order to maximize earning potential.

Additional Resources:
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### Grade Level Units

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### Unit Title

**Chapter 2 - Measurement**

### Unit Summary

In this chapter, students will learn how to read, write, and convert measurements. Students will use formulas to find perimeter, area, and volume.

### Unit Essential Questions:

1. How are unit rates written?
2. How are units of measurement converted?
3. How is the actual length calculated from a scale drawing?
4. How is the scale on a map used?
5. What is the process for using formulas to find the perimeter and area of polygons?
6. What is the process for using formulas to find the circumference and area of circles?
7. What is the process for finding the volume and surface area of three-dimensional figures?

### Key Understandings:

1. Write unit rates.
2. Convert units of measurements.
3. Calculate the actual length from a scale drawing.
4. Use the scale on a map.
5. Use formulas to find the perimeter and area of polygons.
6. Use formulas to find the circumference and area of circles.
7. Use formulas to find the volume and surface area of three-dimensional figures.

### Focus Standards Addressed in the Unit:
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<thead>
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<tbody>
<tr>
<td>CC.2.1.HS.F.3</td>
<td>Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.</td>
</tr>
<tr>
<td>CC.2.1.HS.F.4</td>
<td>Use units as a way to understand problems and to guide the solution of multi-step problems.</td>
</tr>
<tr>
<td>CC.2.3.HS.A.12</td>
<td>Explain volume formulas and use them to solve problems.</td>
</tr>
<tr>
<td>CC.2.3.HS.A.13</td>
<td>Analyze relationships between two-dimensional and three-dimensional objects.</td>
</tr>
</tbody>
</table>

**Important Standards Addressed in the Unit:**

- **CC.2.2.8.C.2** Use concepts of functions to model relationships between quantities.
- **CC.2.2.HS.D.2** Write expressions in equivalent forms to solve problems.

**Misconceptions:**

- The denominator of a unit rate can be any value.
- It doesn’t matter how you set up the rates in terms of what value goes on the numerator/denominator.
- Drawings are always to scale.
- All distances can be measured with a ruler.
- All polygons are shaped like a regular polygon.
- Every parallelogram is a rectangle. Similarly, every rectangle is a square.
- There is only one way to find the area of a polygon.
- When labeling surface area and volume as square or cubic units you should square or cube your solution.
- Solutions using 3.14 are exact solutions.

**Proper Conceptions:**

- The denominator of a unit rate should always be 1.
- Units will cancel each other out if the problem is set up correctly.
- A scale drawing is completely accurate only if all corresponding linear measurements between the drawing and the actual object have the exact same scale factor.
- Measuring a distance that is not a straight line cannot be measured with a ruler.
- Polygons do not necessarily have all congruent sides and congruent angles. Polygons can be irregular-shaped as well.
- Every rectangle is a parallelogram, yet every parallelogram is not a rectangle. Similarly, every square is a rectangle, but not every rectangle is a square.
- There is more than one way to break a polygon up into parts for which the area can be calculated.
- Surface area is measured in square units and volume is measured in cubic units.
- Answers become approximated when 3.14 is substituted in for the value of pi.

**Knowledge & Concepts**

- Rates & Unit Analysis
- Scale Drawings
- Perimeter & Area of Polygons and Circles
- Surface Area & Volume

**Skills & Competencies**

- Write unit rates.
- Convert units of measurements.
- Calculate the dimensions of an actual object given a scale drawing of the object.
- Use the scale on a map.
- Use formulas to find the perimeter and area of polygons.
- Use formulas to find the circumference and area of circles.
- Use formulas to find the volume and surface area of three-dimensional figures.

**Dispositions & Practices**

- Using questioning techniques to encourage creativity, openness to new ideas and concepts, curiosity for new learning, and innovative problem solving skills.
- Using discussion to develop strong communication skills and meaningful interactions.
- Instructional materials and activities to allow students to engage in critical thinking and collaborate effectively.
- Daily informal assessments of student understanding to provide students with the opportunity to fail forward.
and learn from mistakes, be resilient, persevere, and adapt their mindset with the intent to grow and develop as a learner.

- Activities and instructional materials to support literacy in mathematics, reading and writing as well as explore post-secondary career options.
- Classroom environment that supports well-rounded life-long learners with traits such as self-directed, responsible, self-disciplined and self-motivated. This environment also harbors compassionate and empathetic individuals and shows the importance of civic engagement.

### Academic Vocabulary:

- Circumference
- Diameter
- Parallelogram
- Polyhedron
- Rate
- Scale Drawing
- Square
- Trapezoid

- Area
- Face
- Perimeter
- Rectangle
- Scale Factor
- Surface Area
- Unit Rate
- Vertices

- Bases
- Cylinder
- Irrational Number
- Polygon
- Prism
- Scale
- Sphere
- Three-dimensional Objects
- Volume

### Evidence: Assessments and Performance Task(s)

- **Homework** - Students will be required to show work which reinforces classroom concepts. Homework will be evaluated primarily on completion and used as a formative assessment tool.
- **Notes Check** - Students will maintain a set of foldables and/or graphic organizers aligned to learning outcomes. They will be evaluated for completeness and the ability to use such materials on class assignments.
- **Quizzes** - Within each unit, competencies will be assessed in smaller chunks as a grade for the purpose of evaluating student understanding.
- **Unit Test** - Each unit will include a summative written test.
- **Unit Project** - Each unit will include a project and/or real-world application that reinforces the importance of the content.

### Interdisciplinary Connections:

- Learning how to construct a measurement formula and how to use measurement formulas are important skills for future careers.
  - Carpenters use measurement to check for accuracy in right angles.
  - Seamstresses use area formulas to calculate the amount of fabric needed to make curtains & slipcovers.
  - Pharmacists use measurement formulas to determine correct dosages.
  - Environmental Biologists use measurement formulas to determine the concentrations of pollutants in water, soil, and air.
  - Contractors use measurement formulas to compute the amount of materials needed for a project and the subsequent costs.

### Additional Resources:

- Khan Academy
- USA Test Prep
- Textbook Ancillary Materials