DELAWARE VALLEY SCHOOL DISTRICT

PLANNED INSTRUCTION

A PLANNED COURSE FOR:

Honors Pre-Algebra 7

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Curriculum Writing Committee:
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Grade Level: 7

Date of Board Approval: June 2025

Course Weighting: Honors Pre-Algebra

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Chapter Tests	50%	50%	50%	50%
Quizzes	30%	30%	30%	30%
Homework/ Classwork	10%	10%	10%	10%
Graded Assignments	10%	10%	10%	10%
Total Percent	100%	100%	100%	100%

Curriculum Map

Overview:
This rigorous academic course is available to students in grade 7 who have successfully completed Advanced Math 6. The curriculum for Honors Pre-Algebra is intended to prepare students for Honors Algebra. In 7th grade Pre-Algebra, students will build a strong foundation in mathematical concepts and skills aligned with the PA Common Core Standards. It includes topics of integral operations, equations and inequalities with integers, fractions, and decimals, linear operations and graphing, ratios, proportions, and percents, geometry, data analysis, probability, and measurement. Students will engage in problem-solving and critical thinking activities to deepen their understanding and apply mathematical reasoning to real-world situations.

Time/Credit for the Course: Full academic year, 180 days, 1 period per day

Goals:
 Marking Period 1 (45 days) – Students will be able to understand the following:
  Unit 1: Integers- 15 days
- Introduction to Pre Algebra
- Defining an Integer
- Comparing and Ordering Integers
- Evaluating the Absolute Value of Expressions
- Adding Integers
- Subtracting Integers
- Multiplying Integers
- Dividing Integers

- Writing Exponents
- Simplifying Order of Operations with Exponents
- Graphing in Four-Quadrants
- Graphing an Algebraic Relationship

Unit 2: Rational Numbers- 11 days
- Terminating and Repeating Decimals
- Comparing and Ordering Fractions and Decimals
- Writing Rational Numbers as Fractions
- Classifying Rational Numbers
- Multiplying Rational Numbers
- Evaluating Expressions with Fractions
- Dividing Rational Numbers
- Adding and Subtracting Rational Numbers
- Benchmark Assessment

Unit 3: Ratios and Proportional Reasoning- 19 days
- Finding a Unit Rate
- Writing a Ratio as a Fraction in Simplest Form
- Simplifying Complex Fractions
- Identifying Ordered Pairs and Coordinates on a Graph
- Identifying Proportional and Non-Proportional Relationships
- Graphing a Proportional Relationship on a Coordinate Plane
- Graphing to Represent Relations
- Graphing Two-Variable Relations
- Solving Proportions
- Identifying the Constant of Proportionality
- Proportional Relationships with Models and Scale Drawings
- Proportional Relationships between Similar Figures
- Using Indirect Measurement to Solve Real-World Problems

Marking Period 2 (45 days) – Students will be able to understand the following:

Unit 4: Percent Applications - 17 days
- Evaluating the Percent Proportion
- Identifying the Percent of a Number
- Evaluating the Percent of Change
- Sales Tax, Tips, Markups, Discounts, and Simple Interest

Unit 5: Algebraic Expressions - 20 days
- Identifying Variables and Variable Expressions
- Translating Word Phrases into Algebraic Expressions
- Writing Numerical Expressions
- Simplifying Numerical Expressions using Order of Operations including Exponents

- Writing Algebraic Expressions
- Evaluating Algebraic Expressions
- Writing Equivalent Numerical Expressions using the Distributive Property
- Identifying the Parts of an Algebraic Expression
- Simplifying Algebraic Expressions using the Distributive Property
- Adding Linear Expressions
- Finding Perimeter by Adding Linear Expressions
- Subtracting Linear Expressions
- Solving Real World Problems by Adding and Subtracting Linear Expressions
- Finding the GCF of Two Monomials
- Using Properties to Factor Linear Expressions

Unit 6: Equations and Inequalities - 8 days
- Solving Equations by using the Division Property of Equality
- Solving Equations by using the Multiplication Property of Equality
- Solving Two-Step Equations
- Solving Real World Problems Involving Two-Step Equations
- Writing Two-Step Equations
- Solving Verbal Problems by Writing and Solving Two-Step Equations
- Solving Equations of the Form $p(x + p) = r$
- Solving Verbal Problems by Writing and Solving Equation of the Form $p(x + p) = r$

3. Marking Period 3 (45 days) – Students will be able to understand the following:
Unit 6: Equations and Inequalities (continued) - 12 days
- Solving Equations with Variables on One Side
- Writing Inequalities
- Graphing Inequalities on a Number Line
- Solving Inequalities by using the Addition and Subtraction Properties of Inequality
- Solving Inequalities by Multiplying or Dividing by a Positive or Negative Number

Unit 7: Statistics and Probability- 22 days
- Identifying Mean, Median, and Mode as Measures of Center
- Recognizing and Choosing Appropriate Measures of Center and Statistics
- Identifying and Interpreting Measures of Variability
- Interpreting and Analyze Data using Measures of Variability
- Finding the Mean Absolute Deviation of a Set of Data
- Comparing the Mean Absolute Deviations for Two Data Sets
- Comparing Two Populations using the Measure of Center and Variability
- Comparing Two Populations when Only One is Symmetric
- Identifying Various Sampling Techniques
- Making Predictions using Probability
- Finding the Probability of Simple Events
- Probability of Simple Events
- Comparing Theoretical and Experimental Probability

- Probability of Compound Events
- The Fundamental Counting Principle
- Identifying Independent and Dependent Events

Unit 8: 2D Geometry - 11 days
- Classifying Angles
- Identifying Angle Relationships with a Transversal
- Classifying and Calculating Complementary and Supplementary Angles
- Classifying and Calculating Alternate Interior and Exterior Angles
- Classifying and Calculating Vertical Corresponding Angles
- Classifying Triangles
- Calculating the Missing Angle Measure in a Triangle
- Benchmark Assessment 2

4. Marking Period 4 (45 days) – Students will be able to understand the following:
   Unit 8: 2D Geometry (continued) - 7 days
- Calculating Circumference and Area of Circles
- Evaluating Square Roots and Cube Roots
- Finding the Area of Composite Figures

Unit 9: 3D Geometry Area and Volume - 10 days
- Finding the Volume and Surface Area of Prisms and Cubes
- Finding the Surface Area of Prisms and Cubes
- Finding the Volume and Surface Area of Composite Figures
- Identifying and Solving Cross Sections
- PSSA Review

Unit 10: Properties of Exponents - 8 days
- Evaluating Power and Exponents
- Multiplying and Dividing Monomials
- Evaluating Powers of Monomials
- Evaluating Negative Exponents
- Applying Operations with Scientific Notation
- Identifying and Comparing Numbers in the Real Number System
- Estimating Square Roots and Cube Roots

Unit 11: Multi-Step Equations and Inequalities - 8 days
- Solving Multi-Step Equations
- Solving Multi-Step Inequalities
- Solving Equations with Variables on Both Sides
- Solving Equations and Inequalities with No Solution and/or Infinite Solutions.
- Solving Equations with Cube Roots and Square Roots

Unit 12: Linear Functions - 12 days
- Identifying Domain and Range
- Determining if a Relation is a Function

- Writing Functions using Function Notation
- Discerning between Independent and Dependent Variables
- Finding a Constant Rate of Change for a Linear Relationship
- Finding the Slope of a Line
- Determining the Slope and Y-Intercept of a Line
- Using Slope and Y-Intercept to Graph Linear Equations
- Solving a System of Linear Equations by Graphing
- Determining the Number of Solutions of a System of Linear Equations
- Solving a System of Linear Equations Algebraically and Interpreting the Solutions
- Graphing in Four-Quadrants
- Graphing an Algebraic Relationship

Big Ideas:

Big Idea #1: Mathematical relationships among numbers can be represented, compared, and communicated.

Big Idea #2: Mathematical relationships can be represented as expressions, equations, and inequalities in mathematical situations.

Big Idea #3: Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.

Big Idea #4: Patterns exhibit relationships that can be extended, described, and generalized.

Big Idea #5: Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.

Big Idea #6: Data can be modeled and used to make inferences.

Big Idea #7: Geometric relationships can be described, analyzed and classified based on spatial reasoning and/or visualization.

Big Idea #8: Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.

Primary Textbooks and Supplemental Resources:
- Primary Textbook:
  - Glencoe Math Accelerated (2014)
  - Textbook ISBN #: 978-0-07-663798-0
  - Textbook Publisher & Year of Publication: McGraw Hill 2014

- Supplemental Resources (for differentiation and remediation):
  - Teacher created worksheets with Kuta Software
  - IXL
  - PDE SAS Website
  - PDE Item Sampler for Grade 7

Curriculum Plan

Unit 1: Integers   **Time Range in Days: 15 days**

Standard(s):
- CC.2.1.7.E.1 Apply and extend previous understandings of operations with fractions to operations with rational numbers.

Anchors:
- M07.A-N.1.1 Solve real-world and mathematical problems involving the four operations with rational numbers.

Eligible Content:
- M07.A-N.1.1.1 Apply properties of operations to add and subtract rational numbers, including real-world contexts.
- M07.A-N.1.1.2 Represent addition and subtraction on a horizontal or vertical number line.
- M07.A-N.1.1.3 Apply properties of operations to multiply and divide rational numbers, including real-world contexts; demonstrate that the decimal form of a rational number terminates or eventually repeats.

Objectives:
Students will be able to:
1. Classify numbers as integers or non-integers and justify the classification. (DOK 2)
2. Order a set of integers from least to greatest or greatest to least. (DOK 2)
3. Evaluate expressions involving absolute value. (DOK 2)
4. Explain why a sum is positive, negative, or zero using number line models or real-world examples. (DOK 2)
5. Explain how subtracting integers relates to adding the opposite. (DOK 2)
6. Explain why the product of two integers is positive or negative using patterns. (DOK 2)
7. Compare different number line models to determine which accurately represents a given integer operation. (DOK 2)
8. Explain why dividing two integers results in a positive or negative quotient using patterns. (DOK 2)
9. Compare standard and exponential forms of numbers. (DOK 2)
10. Explain why operations must be performed in a specific order using examples. (DOK 2)
11. Explain how integers are used in real-world contexts, such as temperatures or bank balances. (DOK 3)
12. Justify how number line models help explain integer operations conceptually. (DOK 3 and DOK 4)
13. Solve multi-step integer expressions and justify each step in the simplification process. (DOK 3)
14. Research a real-world issue (e.g., environmental changes, economic data) and apply rational number operations to analyze data. Present findings using number lines and justification of methods using properties of operations. (DOK 4)

15. Analyze a solved problem involving rational numbers with an error, correct the problem, and construct an argument using properties of operations to explain why their solution is correct. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Glencoe Math Accelerated Chapter 2 - Lessons 1-6.
- Students will review core lesson vocabulary in both written and verbal form (absolute value, additive inverse, base, coordinate, exponent, inductive reasoning, inequality, integer, negative number, opposites, positive number, power, quadrant, zero pair) through classroom discussion and practice exercises.
- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.
- Students will complete supplemental worksheets to extend learning of all Unit 1 skills: i.e.,
  - https://www.mathmonks.com
  - https://www.math-drills.com
  - https://www.cuemath.com
- Students will make connections with integers in the real world activity.
  - Suggested activity:
    - https://www.teachy.app/en/project/middle-school-en-US/us-6th-grade/math/exploring-the-world-of-whole-numbers-and-integers-elevators-temperature-and-real-world-applications
- Students will engage in instructional activities and questions tailored to the standards found on the PDE SAS website. They will be provided real-world problems and interactive exercises for integers.
  - Suggested activity:
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1530

Assessments:
Diagnostic
- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/FireFly Diagnostic Assessment

Formative
- Teacher observations
- Group activities
- Homework assignments from corresponding textbooks or teacher created worksheets
- Quizzes/graded assignment from Unit 1

Summative
- Common Assessment Unit 1 with CRQ

Unit 2: Rational Numbers   **Time Range in Days: 11 days**

Standard(s):
- CC.2.1.7.E.1 Apply and extend previous understandings of operations with fractions to operations with rational numbers.

Anchors:
- M07.A-N.1.1 Solve real-world and mathematical problems involving the four operations with rational numbers.

Eligible Content:
- M07.A-N.1.1.1 Apply properties of operations to add and subtract rational numbers, including real-world contexts.
- M07.A-N.1.1.3 Apply properties of operations to multiply and divide rational numbers, including real-world contexts; demonstrate that the decimal form of a rational number terminates or eventually repeats.

Objectives:
Students will be able to:
1. Convert fractions to terminating or repeating decimals and explain the process. (DOK 2)
2. Order a set of fractions and decimals from least to greatest or greatest to least. (DOK 2)
3. Convert repeating and terminating decimals into fraction form and explain the process. (DOK 2)
4. Explain why a number belongs to a specific subset of rational numbers (e.g., integer, fraction, terminating decimal). (DOK 2)
5. Explain why the product of two rational numbers is positive or negative. (DOK 2)
6. Compare and contrast different fractional expressions by evaluating them for specific values. (DOK 2)
7. Explain why dividing two rational numbers results in a positive or negative quotient. (DOK 2)
8. Explain why the sum or difference of two rational numbers is positive, negative, or zero using number lines or real-world contexts. (DOK 2)
9. Justify why some fractions produce terminating decimals while others produce repeating decimals using division patterns. (DOK 3)
10. Explain and justify a real-world scenario where comparing and ordering fractions and decimals is necessary (e.g., comparing prices, measurements). (DOK 3)
11. Analyze a real-world situation and explain why expressing a number as a fraction is more useful than as a decimal. (DOK 3)
12. Justify how rational numbers can be represented in different forms and explain their relationships. (DOK 3 and DOK 4)
13. Solve real-world problems involving the multiplication of rational numbers and justify the solution. (DOK 3 and DOK 4)
14. Solve real-world problems involving the division of rational numbers and justify the solution. (DOK 3 and DOK 4)
15. Solve multi-step problems involving the addition and subtraction of rational numbers and justify each step in the solution process. (DOK 3)

16. Design a classroom simulation where students "run" a business, including buying supplies, calculating profit/loss, and managing expenses. Students apply all operations with rational numbers and explain how they used mathematical properties to maintain profitability. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Chapter 3 - Lessons 1-6.
- Students will review core lesson vocabulary in both written and verbal form (bar notation, like fractions, multiplicative inverse, rational number, reciprocal, repeating decimal, terminating decimal, unlike fractions) through classroom discussion and practice exercises.
- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions, and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.
- Students will view math videos for remediation and enrichment, i.e.,mathtv.com.
- Students will have access to real world application videos and lesson building resources, i.e., https://wvia.pbslearningmedia.org.
- Students will complete interactive lessons and printable worksheets, i.e, Mobymax.com.
- Students will engage in individualized learning, i.e., https://www.bytelearn.com/.
- Students will extend understanding of rational numbers, i.e., https://www.cuemath.com/worksheets/rational-numbers-7th-grade-worksheets/.
- Students will engage in instructional activities and questions tailored to the standards found on the PDE SAS website. They will be provided real-world problems and interactive exercises related to rational numbers.
  - Suggested activities:
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1530
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1532

Assessments:
    Diagnostic
- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/FireFly Diagnostic Assessment

    Formative
- Teacher observations
- Group activities
- Homework assignments from corresponding textbooks or teacher created worksheets
- Quizzes/graded assignment from Unit 2

    Summative
- Common Assessment Unit 2 with CRQ

Unit 3: Ratios and Proportional Reasoning   **Time Range in Days: 19 days**

Standard(s):
- CC.2.1.7.D.1 Analyze proportional relationships and use them to model and solve real-world and mathematical problems.
- CC.2.3.7.A.2 Visualize and represent geometric figures and describe the relationships between them.

Anchors:
- M07.A-R.1.1 Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems.
- M07.C-G.1.1 Describe and apply properties of geometric figures.

Eligible Content:
- M07.A-R.1.1.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. Example: If a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2 / 1/4 miles per hour, equivalently 2 miles per hour.
- M07.A-R.1.1.2 Determine whether two quantities are proportionally related (e.g., by testing for equivalent ratios in a table, graphing on a coordinate plane and observing whether the graph is a straight line through the origin).
- M07.A-R.1.1.3 Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- M07.A-R.1.1.4 Represent proportional relationships by equations. Example: If total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.
- M07.A-R.1.1.5 Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r), where r is the unit rate.
- M07.C-G.1.1.1 Solve problems involving scale drawings of geometric figures, including finding length and area.

Objectives:
Students will be able to:
1. Compare unit rates to determine the better value in a real-world context. (DOK 2)
2. Simplify a ratio expressed as a fraction. (DOK 2)
3. Simplify complex fractions using division of fractions. (DOK 2)
4. Write an equation of the form y=kx to represent a proportional relationship. (DOK 2)
5. Describe how the graph of a proportional relationship always passes through the origin. (DOK 2)
6. Compare proportional and nonproportional relationships and explain the differences. (DOK 2)
7. Determine missing values in proportional relationships using various strategies. (DOK 2)
8. Explain the relationship between the constant of proportionality and the unit rate. (DOK 2)
9. Interpret graphs of relationships and explain patterns. (DOK 2)

10. Graph a two-variable relationship from a table or equation. (DOK 2)
11. Use proportions to find missing values in scale drawings and models. (DOK 2)
12. Set up and solve proportions to determine missing side lengths in similar figures. (DOK 2)
13. Use proportions to solve for missing measurements using indirect measurement methods. (DOK 2)
14. Justify the importance of unit rates in making real-world decisions, such as comparing prices or speeds. (DOK 3)
15. Solve real-world problems involving complex fractions and justify the solution. (DOK 3)
16. Justify why an equation represents a proportional relationship based on tables, graphs, and real-world scenarios. (DOK 3)
17. Explain how the slope of the graph represents the unit rate and justify its meaning in a real-world context. (DOK 3)
18. Justify whether a relationship is proportional or non-proportional based on multiple representations and real-world examples. (DOK 3)
19. Solve multi-step problems involving proportions in real-world applications and justify the reasoning. (DOK 3)
20. Analyze different representations of proportional relationships and justify the significance of the constant of proportionality. (DOK 3)
21. Explain how scale models and proportions are used in real-world applications such as maps and blueprints. (DOK 3)
22. Justify why two figures are similar and explain how proportionality is maintained. (DOK 3)
23. Justify the use of indirect measurement in real-world applications such as shadows, mirrors, or surveying. (DOK 4)
24. Design a scale model of a room, building, or park. Use scale drawings to compute lengths and areas, apply unit rates to manage material costs, and represent proportional relationships using equations and graphs. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Glencoe Math Accelerated Chapter 5 - Lessons 1-3, and 5-10.
- Students will review core lesson vocabulary in both written and verbal form (complex fraction, numerator, denominator, congruent, constant of proportionality, corresponding parts, cross products, dimensional analysis, indirect measurement, non-proportional, proportion, proportional, rate, ratio, scale, scale drawing, scale factor, scale model, similar figures, unit rate, graph, coordinate plane, quadrants, ordered pair, x-coordinate, y-coordinate, x-axis, y-axis, origin) through classroom discussion and practice exercises.
- Students will be able to apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions and CRQ practice.
- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions, and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.

- Students will complete supplemental worksheets to extend learning of all Unit 4 skills, i.e.,
  - https://www.cuemath.com
  - https://www.education.com
  - https://www.hanlonmath.com/pdfFiles/resource_2259.pdf
- Students will engage in instructional activities and questions tailored to the standards found on the PDE SAS website. They will be provided real-world problems and interactive exercises related to ratios and proportional reasoning.
  - Suggested activities:
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1524
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1526
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1527
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1542

Assessments:

Diagnostic
- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/FireFly Diagnostic Assessment

Formative
- Teacher observations
- Group activities
- Homework assignments from corresponding textbooks or teacher created worksheets
- Quizzes/graded assignment from Unit 3

Summative
- Common Assessment Unit 3 with CRQ

Unit 4: Percent Applications   **Time Range in Days: 17 days**

Standard(s):
- CC.2.1.7.D.1 Analyze proportional relationships and use them to model and solve real-world and mathematical problems.
- CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

Anchors:
- M07.A-R.1.1 Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems.
- M07.B-E.2.1 Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers.

Eligible Content:
- M07.A-R.1.1.6 Use proportional relationships to solve multi-step ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease.
- M07.B-E.2.1.1 Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate. Example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50 an hour (or $1.1 \times \$25 = \$27.50$).

Objectives:
Students will be able to:
1. Calculate the percent proportion given two of the three components (part, whole, percent). (DOK 2)
2. Use the formula to find the percent of a number in a variety of numerical and word problems. (DOK 2)
3. Calculate the percent of change between two values in word problems. (DOK 2)
4. Calculate each using provided formulas in straightforward scenarios. (DOK 2)
5. Solve real-world problems using percent proportion, such as finding what percent one number is of another. (DOK 3)
6. Apply the concept to multi-step problems, such as finding discounts or tax on purchases. (DOK 3)
7. Analyze situations where percent of change applies, comparing scenarios with different percentages. (DOK 3)
8. Solve complex word problems that involve multiple financial concepts, such as finding the final price after applying tax, discounts, and tips. (DOK 3)
9. Develop a presentation where students track changes in prices or data over time, calculating and interpreting percent of change. (DOK 4)
10. Design a real-world project, such as planning a shopping trip or a small business scenario, where students apply all the concepts to manage a budget. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Glencoe Math Accelerated Chapter 6 - Lessons 1, 4, 5, and 6.
- Students will review core lesson vocabulary in both written and verbal form (discount, interest, markup, percent equation, percent error, percent of change, percent of decrease, percent of increase, percent proportion, principal, simple interest, gratuity, selling price, sales tax, tips) through classroom discussion and practice exercises.
- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Explain and apply concepts of expressions through writing, given a real world problem, using PSSA Constructed Response Questions found in the math department public folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.
- Show students a visual and use of strategies when finding a percent of a number, i.e., https://madeformath.com/percent-of-a-number/.
- A group activity to practice finding the percent of a number, i.e., https://www.education.com/activity/article/percent-flash/.
- Students will engage in instructional activities and questions tailored to the standards found on the PDE SAS website. They will be provided real-world problems and interactive exercises related to percent applications.
  - Suggested activities:
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1534
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1529

Assessments:
Diagnostic
- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT/FireFly Diagnostic Assessment

Formative
- Teacher observations
- Group activities
- Homework assignments from corresponding textbooks or teacher created worksheets
- Quizzes/graded assignment from Unit 4

Summative
- Common Assessment Unit 4 with CRQ

Unit 5: Algebraic Expressions   **Time Range in Days: 20 days**

Standard(s):
- CC.2.2.7.B.1 Apply properties of operations to generate equivalent expressions.
- CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

Anchors:
- M07.B-E.1.1 Use properties of operations to generate equivalent expressions.
- M07.B-E.2.1 Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers.
- M07.B-E.2.3 Determine the reasonableness of the answer(s) in problem solving situations.

Eligible Content:
- M07.B-E.1.1.1 Apply properties of operations to add, subtract, factor, and expand linear expressions with rational coefficients. Example 1: The expression $1/2 \cdot (x + 6)$ is equivalent to $1/2 \cdot x + 3$. Example 2: The expression $5.3 – y + 4.2$ is equivalent to $9.5 – y$ (or $–y + 9.5$). Example 3: The expression $4w – 10$ is equivalent to $2(2w – 5)$.
- M07.B-E.2.1.1 Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate. Example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50 an hour (or $1.1 \times \$25 = \$27.50$).
- M07.B-E.2.3.1 Determine the reasonableness of answer(s) or interpret the solution(s) in the context of the problem. Example: If you want to place a towel bar that is 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

Objectives:
Students will be able to:
1. Evaluate simple algebraic expressions. (DOK 2)
2. Identify and use mathematical properties to simplify algebraic expressions. (DOK 2)
3. Apply the distributive property to rewrite algebraic expressions. (DOK 2)
4. Simplify algebraic expressions. (DOK 2)
5. Add, subtract and factor linear expressions. (DOK 3)
6. Solve complex word problems by converting multi-step phrases into algebraic expressions. (DOK 3)
7. Apply numerical expressions to solve multi-step problems. (DOK 3)
8. Analyze expressions to determine the most efficient factoring method. (DOK 3)
9. Interpret the results of added or subtracted expressions within a real-world context.(DOK 3)
10. Analyze and verify equivalence between original and distributed expressions. (DOK 3)
11. Synthesize the relationships and extend terms in arithmetic sequences. (DOK 4)
12. Develop scenarios where students create their own variable expressions to model real-world situations. (DOK 4)
13. Create an authentic task where students design shapes with specific perimeter

requirements using linear expressions. (DOK 4)
14. Develop an authentic problem where students apply factoring to simplify expressions and solve real-world challenges, such as scaling a recipe or designing a layout. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Glencoe Math Accelerated Chapter 1 - Lessons 1-2 and Chapter 7 - Lessons 1-5.
- Students will review core lesson vocabulary in both written and verbal form (coefficient, constant, Distributive Property, equivalent expressions, factor, factored form, like terms, linear expression, simplest form, simplifying the expression, term) through classroom discussion and practice exercises.
- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Explain and apply concepts of equations and inequalities through writing, given a real world problem, using PSSA Constructed Response Questions found in the math department public folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.
- Students will use Algebra Tiles to help students determine unlike terms and how to combine, i.e., https://www.youtube.com/watch?v=EdZm5jTCEIo.
- Students can watch videos for remediation and enrichment, i.e., mathtv.com.
- Students can complete interactive lessons and printable worksheets, i.e., Mobymax.com.
- Students will engage in instructional activities and questions tailored to the standards found on the PDE SAS website. They will be provided real-world problems and interactive exercises related to algebraic expressions.
    - Suggested activity:
        - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1533

Assessments:
Diagnostic
- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT Diagnostic Assessment

Formative
- Teacher observations
- Group activities
- Homework assignments from corresponding textbooks or teacher created worksheets
- Quizzes/graded assignment from Unit 5

Summative
- Common Assessment Unit 5 and CRQ

Unit 6: Equations and Inequalities   **Time Range in Days: 20 days**

Standard(s):
- CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

Anchors:
- M07.B-E.2.2 Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems.

Eligible Content:
- M07.B-E.2.2.1 Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Example: The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?
- M07.B-E.2.2.2 Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers, and graph the solution set of the inequality. Example: A salesperson is paid $50 per week plus $3 per sale. This week she wants her pay to be at least $100. Write an inequality for the number of sales the salesperson needs to make and describe the solutions.

Objectives:
Students will be able to:
1. Use models to write and solve addition and subtraction equations. (DOK 2)
2. Solve one-step multiplication and division problems. (DOK 2)
3. Solve two-step equations. (DOK 2)
4. Solve two-step equations of the form $p(x + q) = r$. (DOK 2)
5. Solve inequalities by using the addition and subtraction properties of inequality. (DOK 2)
6. Solve inequalities using multiplication and division properties of inequality. (DOK 2)
7. Model and solve two-step inequalities. (DOK 2)
8. Analyze and compare different strategies for solving equations with variables on one side. (DOK 3)
9. Apply inequalities to model and solve real-world situations. (DOK 3)
10. Interpret the meaning of graphed inequalities in real-world scenarios. (DOK 3)
11. Analyze solutions and determine if they make sense in the context of the problem. (DOK 3)
12. Evaluate different methods for solving the same verbal problem. (DOK 3)
13. Create a real-world scenario where multi-step equations are necessary to find a solution, such as calculating total costs or budgeting. (DOK 4)
14. Create real-world problems where students use addition and subtraction properties of inequalities to find solutions and justify their reasoning. (DOK 4)
15. Design a number line to represent the solution to a two-step inequality. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Glencoe Math Accelerated Chapter 6.
- Students will review core lesson vocabulary in both written and verbal form (addition

property of equality, addition property of inequality, coefficient, division property of equality, division property of inequality, equation, equivalent equation, inequality, multiplication property of equality, multiplication property of inequality, solution, subtraction property of equality, subtraction property of inequality, two-step equation, two-step inequality, term) through classroom discussion and practice exercises.

- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Students can explain and apply concepts of statistics through writing, given a real world problem, using PSSA Constructed Response Questions found in the math department public folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.
- Students will complete supplemental worksheets to extend learning of all Unit 6 skills, i.e.,
  - https://www.mathmonks.com
  - https://www.math-drills.com
  - https://www.cuemath.com
- Students will engage in instructional activities and questions tailored to the standards found on the PDE SAS website. They will be provided real-world problems and interactive exercises related to one and two-step equations and inequalities.
  - Suggested activities:
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1535
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1536

Assessments:
  Diagnostic
  - Teacher questioning and observations
  - Teacher prepared diagnostic test
  - Pennsylvania CDT Diagnostic Assessment

  Formative
  - Teacher observations
  - Group activities
  - Homework assignments from corresponding textbooks or teacher created worksheets
  - Quizzes/graded assignment from Unit 6

  Summative
  - Common Assessment Unit 6 with CRQ

Unit 7: Statistics and Probability   **Time Range in Days: 22 days**

Standard(s):
- CC.2.4.7.B.1 Draw inferences about populations based on random sampling concepts.
- CC.2.4.7.B.2 Draw informal comparative inferences about two populations.
- CC.2.4.7.B.3 Investigate chance processes and develop, use, and evaluate probability models.

Anchors:
- M07.D-S.1.1 Use random samples.
- M07.D-S.2.1 Use statistical measures to compare two numerical data distributions.
- M07.D-S.3.1 Predict or determine the likelihood of outcomes.
- M07.D-S.3.2 Use probability to predict outcomes.

Eligible Content:
- M07.D-S.1.1.1 Determine whether a sample is a random sample given a real-world situation.
- M07.D-S.1.1.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Example 1: Estimate the mean word length in a book by randomly sampling words from the book. Example 2: Predict the winner of a school election based on randomly sampled survey data.
- M07.D-S.2.1.1 Compare two numerical data distributions using measures of center and variability. Example 1: The mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team. This difference is equal to approximately twice the variability (mean absolute deviation) on either team. On a line plot, note the difference between the two distributions of heights. Example 2: Decide whether the words in a chapter of a seventh grade science book are generally longer than the words in a chapter of a fourth grade science book.
- M07.D-S.3.1.1 Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible (i.e., a probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event).
- M07.D-S.3.2.1 Determine the probability of a chance event given relative frequency. Predict the approximate relative frequency given the probability. Example: When rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times but probably not exactly 200 times.
- M07.D-S.3.2.2 Find the probability of a simple event, including the probability of a simple event not occurring. Example: What is the probability of not rolling a 1 on a number cube?
- M07.D-S.3.2.3 Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.

Objectives:
Students will be able to:
1. Find the probability of independent events. (DOK 2)
2. Identify measures of center and variability. (DOK 2)

3. Interpret data using mean absolute deviation. (DOK 2)
4. Interpret a simple event and its complement to find the probability. (DOK 2)
5. Differentiate theoretical and experimental probabilities. (DOK 3)
6. Use multiplication to count the number of outcomes and find probabilities. (DOK 3)
7. Determine whether sample methods are valid. (DOK 3)
8. Identify misleading graphs and statistics. (DOK 3)
9. Analyze similarities and differences between two populations. (DOK 4)
10. Select, organize, and construct appropriate data displays. (DOK 4)
11. Analyze probabilities of compound events. (DOK 4)
12. Perform probability simulations to model real world situations involving uncertainty. (DOK 4)
13. Analyze a sample to predict actions of a larger group. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Glencoe Math Accelerated Chapter 7.
- Students will review core lesson vocabulary in both written and verbal form**:** (chance event, probability, random event, compound event, independent event, biased sample, convenience sample, complementary events, experimental probability, fair, outcome, relative frequency, sample space, simple event, theoretical probability, unfair, double box plot, double dot plot, mean, mean absolute deviation, median, mode, quartiles, interquartile range, population, range, sample, simple random sample, statistics, survey, systematic random sample, unbiased sample, voluntary response sample) through classroom discussion and practice exercises.
- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Students can explain and apply concepts of probability through writing, given a real world problem, using PSSA Constructed Response Questions found in the math department public folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.
- Students will complete supplemental worksheets to extend learning of all Unit 7 skills, i.e.,
  - https://www.mathmonks.com
  - https://www.math-drills.com
  - https://www.cuemath.com
- Students will engage in instructional activities and questions tailored to the standards found on the PDE SAS website. They will be provided real-world problems and interactive exercises related to statistics and probability.
  - Suggested activities:
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1546
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1547
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1548
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1549

- https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1551

Assessments:

Diagnostic
- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT Diagnostic Assessment

Formative
- Teacher observations
- Group activities
- Homework assignments from corresponding textbooks or teacher created worksheets
- Quizzes/graded assignment from Unit 7

Summative
- Common Assessment Unit 7 with CRQ

Unit 8: 2D Geometry   **Time Range in Days: 18 days**

Standard(s):
- CC.2.3.7.A.1 Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume.
- CC.2.3.7.A.2 Visualize and represent geometric figures and describe the relationships between them.

Anchors:
- M07.C-G.2.1 Identify, use, and describe properties of angles and their measures.
- M07.C-G.2.2 Determine circumference, area, surface area, and volume.
- M07.C-G.1.1 Describe and apply properties of geometric figures.

Eligible Content:
- M07.C-G.2.1.1 Identify and use properties of supplementary, complementary, and adjacent angles in a multistep problem to write and solve simple equations for an unknown angle in a figure.
- M07.C-G.2.1.2 Identify and use properties of angles formed when two parallel lines are cut by a transversal (e.g., angles may include alternate interior, alternate exterior, vertical, corresponding).
- M07.C-G.2.2.1 Find the area and circumference of a circle. Solve problems involving area and circumference of a circle(s). Formulas will be provided.
- M07.C-G.2.2.2 Solve real-world and mathematical problems involving area, volume, and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. Formulas will be provided.
- M07.C-G.1.1.2 Identify or describe the properties of all types of triangles based on angle and side measures.
- M07.C-G.1.1.3 Use and apply the triangle inequality theorem.

Objectives:
Students will be able to:
1. Determine angle measures using relationships of complementary, supplementary, vertical, and corresponding angles. (DOK 2)
2. Use angle relationships formed by a transversal to find missing angle measures. (DOK 2)
3. Calculate the missing angle measure in a triangle using the sum of the interior angles. (DOK 2)
4. Solve real-world problems involving complementary and supplementary angles. (DOK 2)
5. Apply the properties of alternate interior, alternate exterior, vertical, and corresponding angles to find unknown angle measures. (DOK 2)
6. Use the formulas for circumference and area of circles to solve problems. (DOK 2)
7. Decompose composite figures into simpler shapes to calculate the total area. (DOK 2)
8. Justify the classification of angles and triangles based on given properties. (DOK 3)
9. Explain and apply angle relationships in a transversal to solve multi-step problems. (DOK 3)
10. Solve real-world and mathematical problems involving the area and circumference of circles. (DOK 3)

11. Compare and contrast different types of triangles and their properties. (DOK 3)
12. Analyze and determine the most efficient way to decompose a composite figure for calculating area. (DOK 3)
13. Apply properties of angle relationships to prove congruency or similarity in geometric figures. (DOK 3)
14. Develop and justify a mathematical argument using angle relationships with a transversal. (DOK 4)
15. Construct and solve a real-world problem requiring the application of multiple angle relationships. (DOK 4)
16. Design and justify an efficient method for determining the area of an irregular composite figure. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Glencoe Math Accelerated Chapter 11.
- Students will review core lesson vocabulary in both written and verbal form (alternate interior, alternate exterior, adjacent angles, transversal, parallel lines, corresponding angles, circle, circumference, complementary angles, supplementary angles, right angle, straight angle, triangle inequality theorem, vertical angles, vertex, acute angle, obtuse angle) through classroom discussion and practice exercises.
- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Explain and apply concepts of 2D geometry through writing, given a real world problem, using PSSA Constructed Response Questions found in the math department public folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.
- Students will complete supplemental worksheets to extend learning of all Unit 8 skills, i.e.,
  - https://www.mathmonks.com
  - https://www.math-drills.com
  - https://www.cuemath.com
- Students will engage in instructional activities and questions tailored to the standards found on the PDE SAS website. They will be provided real-world problems and interactive exercises related to 2D geometry.
  - Suggested activities:
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1538
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1539
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1541
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1543
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1544

Assessments:
    Diagnostic
- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT Diagnostic Assessment

    Formative
- Teacher observations
- Group activities
- Homework assignments from corresponding textbooks or teacher created worksheets
- Quizzes/graded assignment from Unit 8

    Summative
- Common Assessment Unit 8 with CRQ

Unit 9: 3D Geometry Area and Volume   **Time Range in Days: 10 days**

Standard(s):
- CC.2.3.7.A.1 Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume.
- CC.2.3.7.A.2 Visualize and represent geometric figures and describe the relationships between them.

Anchors:
- M07.C-G.2.2 Determine circumference, area, surface area, and volume.
- M07.C-G.1.1 Describe and apply properties of geometric figures.

Eligible Content:
- M07.C-G.2.2.2 Solve real-world and mathematical problems involving area, volume, and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. Formulas will be provided.
- M07.C-G.1.1.4 Describe the two-dimensional figures that result from slicing three-dimensional figures. Example: Describe plane sections of right rectangular prisms and right rectangular pyramids.

Objectives:
Students will be able to:
1. Apply the formulas for volume and surface area to solve real-world problems involving prisms and cubes. (DOK 2)
2. Determine the surface area and volume of composite figures by decomposing them into simpler shapes. (DOK 2)
3. Identify the two-dimensional shape that results from slicing a three-dimensional figure. (DOK 2)
4. Compare and contrast different cross-sections of three-dimensional figures. (DOK 2)
5. Explain how changing dimensions of a prism or cube affects its volume and surface area. (DOK 2)
6. Justify the steps used to calculate the volume or surface area of a composite figure. (DOK 3)
7. Analyze and determine the most efficient method to find the surface area of a prism or cube based on its net. (DOK 3)
8. Solve multi-step real-world problems involving volume and surface area. (DOK 3)
9. Explain why different cross-sections of the same figure produce different two-dimensional shapes. (DOK 3)
10. Develop and compare strategies for decomposing complex three-dimensional figures into simpler ones to calculate volume and surface area. (DOK 3)
11. Create and solve a real-world problem that involves finding the surface area and volume of a composite figure. (DOK 4)
12. Explore and defend how the volume and surface area of a figure change when its dimensions are scaled up or down. (DOK 4)
13. Design a real-world project that involves constructing a 3D model and calculating its surface area and volume. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Glencoe Math Accelerated Chapters 11 and 12.
- Students will review core lesson vocabulary in both written and verbal form (cube, congruent, faces, pyramid, polygonal prism, circle, center, circumference, diameter, radius, pi, semicircle, composite figure, volume, surface area, bases, plane, coplanar, parallel, polygon, edge, face, vertex, diagonal, skew lines, cross section) through classroom discussion and practice exercises.
- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Explain and apply concepts of 3D geometry through writing, given a real world problem, using PSSA Constructed Response Questions found in the math department public folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.
- Students will complete supplemental worksheets to extend learning of all Unit 9 skills, i.e.,
  - https://www.mathmonks.com
  - https://www.math-drills.com
  - https://www.cuemath.com
- Students will engage in instructional activities and questions tailored to the standards found on the PDE SAS website. They will be provided real-world problems and interactive exercises related to 3D geometry.
  - Suggested activities:
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1541
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1545

Assessments:

Diagnostic
- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT Diagnostic Assessment

Formative
- Teacher observations
- Group activities
- Homework assignments from corresponding textbooks or teacher created worksheets
- Quizzes/graded assignment from Unit 9

Summative
- Common Assessment Unit 9 with CRQ

Unit 10: Properties of Exponents   **Time Range in Days: 8 days**

Standard(s):
- CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.

Anchors:
- M08.B-E.1.1 Represent and use expressions and equations to solve problems involving radicals and integer exponents.

Eligible Content:
- M08.B-E.1.1.1 Apply one or more properties of integer exponents to generate equivalent numerical expressions without a calculator (with final answers expressed in exponential form with positive exponents). Properties will be provided. Example: $3^{12} \times 3^{-15} = 3^{-3} = 1/(3^3)$
- M08.B-E.1.1.3 Estimate very large or very small quantities by using numbers expressed in the form of a single digit times an integer power of 10 and express how many times larger or smaller one number is than another. Example: Estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9 and determine that the world population is more than 20 times larger than the United States' population.
- M08.B-E.1.1.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Express answers in scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology (e.g., interpret 4.7EE9 displayed on a calculator as 4.7×10^9).

Objectives:
Students will be able to:
1. Apply the properties of exponents to simplify expressions. (DOK 2)
2. Multiply and divide monomials, applying appropriate exponent rules. (DOK 2)
3. Evaluate and simplify expressions with negative exponents. (DOK 2)
4. Convert numbers between scientific notation and standard form. (DOK 2)
5. Compare and order numbers from the real number system, including rational and irrational numbers. (DOK 2)
6. Estimate and approximate square roots and cube roots in mathematical and real-world contexts. (DOK 2)
7. Justify the use of exponent rules to simplify expressions involving monomials. (DOK 3)
8. Solve real-world problems using operations with scientific notation. (DOK 3)
9. Explain why a number is rational or irrational based on its decimal expansion. (DOK 3)
10. Compare the magnitude of numbers in scientific notation using properties of exponents. (DOK 3)
11. Analyze how changing the base or exponent in a power affects its value. (DOK 3)
12. Determine the most precise square root or cube root approximation needed for a given situation. (DOK 3)
13. Develop and defend a strategy for solving real-world problems involving powers and

exponents. (DOK 4)

14. Create and solve multi-step problems that require applying operations with scientific notation. (DOK 4)
15. Investigate the relationship between negative exponents and fractions, providing justification with examples. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Glencoe Math Accelerated Chapter 4.
- Students will review core lesson vocabulary in both written and verbal form (exponent, base, power, squared, cubed, radical, scientific notation, simplify, evaluate, negative exponent, monomial) through classroom discussion and practice exercises.
- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Students will explain and apply concepts of exponents through writing, given a real world problem, using PSSA Constructed Response Questions found in the math department public folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.
- Students will engage in instructional activities and questions tailored to the standards found on the PDE SAS website. They will be provided real-world problems and interactive exercises related to properties of exponents.
  - Suggested activities:
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1676
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1678
    - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1679

Assessments:

Diagnostic
- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT Diagnostic Assessment

Formative
- Teacher observations
- Group activities
- Homework assignments from corresponding textbooks or teacher created worksheets
- Quizzes/graded assignment from Unit 10

Summative
- Common Assessment Unit 10 with CRQ

Unit 11: Multi-Step Equations and Inequalities   **Time Range in Days: 8 days**

Standard(s):
- CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.

Anchors:
- M08.B-E.3.1 Write, solve, graph, and interpret linear equations in one or two variables, using various methods.

Eligible Content:
- M08.B-E.3.1.1 Write and identify linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
- M08.B-E.3.1.2 Solve linear equations that have rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Objectives:
Students will be able to:
1. Solve multi-step equations involving distribution, combining like terms, and variables on both sides. (DOK 2)
2. Solve multi-step inequalities and represent the solution set graphically. (DOK 2)
3. Determine whether an equation has one solution, no solution, or infinitely many solutions. (DOK 2)
4. Solve equations with variables on both sides, including those with fractions and decimals. (DOK 2)
5. Solve equations involving square roots and cube roots. (DOK 2)
6. Verify solutions to equations and inequalities by substitution. (DOK 2)
7. Justify the steps used to solve a multi-step equation or inequality. (DOK 3)
8. Explain why an equation may have no solution or infinitely many solutions. (DOK 3)
9. Solve and interpret real-world problems that require solving equations or inequalities. (DOK 3)
10. Compare and contrast equations and inequalities, explaining differences in solutions. (DOK 3)
11. Create and solve multi-step equations and inequalities that model real-world situations. (DOK 3)
12. Develop and justify a multi-step problem that includes equations or inequalities with no solution or infinitely many solutions. (DOK 4)
13. Construct a real-world scenario that requires solving an equation with a square root or cube root. (DOK 4)
14. Analyze and critique different solution strategies for solving complex equations and inequalities. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Glencoe Math Accelerated Chapter 8.
- Students will review core lesson vocabulary in both written and verbal form (coefficient, equation, equivalent equation, inequality, two-step equation, two-step inequality, term, solution set, null set, identity/all real numbers, constant, like terms, inverse operations, distributive property, simplify, open circle, closed circle) through classroom discussion and practice exercises.
- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Students will apply concepts of congruence, similarity, and transformations through writing, given a real world problem, using PSSA Constructed Response Questions found in the math department public folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer.
- Students will engage in instructional activities and questions tailored to the standards found on the PDE SAS website. They will be provided real-world problems and interactive exercises related to multi-step equations and inequalities.
    - Suggested activities:
        - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1683
        - https://www.pdesas.org/SearchWeb/Item/ItemDetail?itemId=1684

Assessments:

Diagnostic
- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT Diagnostic Assessment

Formative
- Teacher observations
- Group activities
- Homework assignments from corresponding textbooks or teacher created worksheets
- Quizzes/graded assignment from Unit 11

Summative
- Common Assessment Unit 11 with CRQ

Unit 12: Linear Functions   **Time Range in Days: 12 days**

Standard(s):
- CC.2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations.
- CC.2.2.8.C.2 Use concepts of functions to model relationships between quantities.
- CC.2.2.8.C.1 Define, evaluate, and compare functions.

Anchors:
- M08.B-E.2.1 Analyze and describe linear relationships between two variables, using slope.
- M08.B-F.2.1 Represent or interpret functional relationships between quantities using tables, graphs, and descriptions.
- M08.B-F.1.1 Define, evaluate, and compare functions displayed algebraically, graphically, or numerically in tables or by verbal descriptions.

Eligible Content:
- M08.B-E.2.1.1 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. Example: Compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
- M08.B-E.2.1.2 Use similar right triangles to show and explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane.
- M08.B-E.2.1.3 Derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.
- M08.B-F.2.1.1 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values.
- M08.B-F.2.1.2 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch or determine a graph that exhibits the qualitative features of a function that has been described verbally.
- M08.B-F.1.1.1 Determine whether a relation is a function.
- M08.B-F.1.1.3 Interpret the equation $y = mx + b$ as defining a linear function whose graph is a straight line; give examples of functions that are not linear.

Objectives:
Students will be able to:
1. Determine whether a relation is a function based on its domain and range. (DOK 2)
2. Write a function equation given a real-world scenario using function notation. (DOK 2)
3. Compare and contrast independent and dependent variables in different contexts. (DOK 2)
4. Find the slope of a line from a table, graph, or two given points. (DOK 2)
5. Determine the slope and y-intercept of a linear equation in different forms (standard

form, slope-intercept form, point-slope form). (DOK 2)
6. Solve a system of linear equations by graphing and identify the point of intersection. (DOK 2)
7. Determine the number of solutions of a system of linear equations (one solution, no solution, infinitely many solutions). (DOK 2)
8. Graph algebraic relationships in all four quadrants of the coordinate plane. (DOK 2)
9. Justify whether a given set of points, table, or graph represents a function. (DOK 3)
10. Interpret the meaning of the slope and y-intercept in the context of a real-world problem. (DOK 3)
11. Explain how the slope of a line affects its steepness and direction. (DOK 3)
12. Compare and contrast different methods for solving systems of linear equations (graphing, substitution, elimination). (DOK 3)
13. Explain how changing the slope or y-intercept in an equation affects the graph. (DOK 3)
14. Analyze and interpret the solution to a system of equations in a real-world context. (DOK 3)
15. Write and graph linear equations to model a real-world scenario. (DOK 3)
16. Design an investigation that involves solving and interpreting a system of equations in a real-world scenario. (DOK 4)
17. Explore how transformations (shifts, reflections, stretches) affect the slope and y-intercept of a linear function. (DOK 4)
18. Construct and analyze different methods for solving a system of equations, determining which is most efficient in a given situation. (DOK 4)

Core Activities and Corresponding Instructional Methods:
- Students will engage in problem sets from corresponding textbook/workbook: i.e., Glencoe Math Accelerated Chapter 9.
- Students will review core lesson vocabulary in both written and verbal form (domain, range, relation, function, function notation, independent and dependent variables, constant rate of change, linear, slope, y-intercept, graph, systems, solution, quadrant) through classroom discussion and practice exercises.
- Students will apply vocabulary in reasoning, explaining processes, and solving problems through authentic classroom discussions and CRQ practice from the PDE PSSA samplers and teacher-made PSSA CRQ practice samplers in a shared public file folder.
- Students will apply concepts of linear functions through writing, given a real world problem, using PSSA Constructed Response Questions found in the math department public folder.
- Students will do math by hand to promote a deeper understanding of mathematical concepts to actively engage with the learning process. Students will use a calculator to provide a quick and accurate answer, i.e., Kuta worksheets or IXL exercises

Assessments:

Diagnostic
- Teacher questioning and observations
- Teacher prepared diagnostic test
- Pennsylvania CDT Diagnostic Assessment

Formative
- Teacher observations
- Group activities
- Homework assignments from corresponding textbooks or teacher created worksheets
- Quizzes/graded assignment from Unit 12

Summative
- Common Assessment Unit 12 with CRQ