Program Transfer Goals

- Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

PACING

First Grading Period		Second Grading Period			Third Grading Period		Fourth Grading Period	
Unit 1: Numbers and Operations	Unit 2: Equations and Inequalities	Unit 3: Proportionality	Unit 4: Multiple Representations	Unit 5: 2D Geometric Relationships	Unit 6: 3D Geometric Relationships	Unit 7: Data Analysis and Probability	Unit 8: Personal Finance	Unit 9: Pythagorean Theorem
BOY Screener					MOY Screener		EOY Screener	

Assurances for a Guaranteed and Viable Curriculum

Adherence to this scope and sequence affords every member of the learning community clarity on the knowledge and skills on which each learner should demonstrate proficiency. In order to deliver a guaranteed and viable curriculum, our team commits to and ensures the following understandings:

Shared Accountability: Responding to the Needs of All Learners

- High levels of learning for all students.
- The district and course formative assessments aligned to the standards for this course support educators and learners in monitoring academic achievement and leveraging interventions.

Shared Understanding: Curriculum Design

- The district curriculum design weaves together the elements of content, skills and assessments in order to adhere to curriculum design at the macro and micro level, ensuring vertical alignment.
- The district curriculum incorporates standards, scope and sequence, enduring understandings, essential questions, performance assessments, and recommended resources.

Interdependence: Curriculum Units

Members of the learning community utilize the curriculum units, plan collaboratively, and reflect on results for continuous improvement.

UNIT 1: NUMBERS AND OPERATIONS

TIMELINE: 6 WEEKS - 1ST GRADING PERIOD

The unit begins with an exploration of rational numbers in a variety of forms, including conversions between the forms. As the learners study numbers in sets and subsets, they use visual representations to categorize and organize the numbers. Irrational numbers including pi and square roots are approximated, compared and ordered as the learners continue to study equivalence and scale. Scientific notation is introduced later in the unit.   And, finally, the learners extend previous understandings of operations and use rational numbers to solve real-world problems.

- ■ **Transfer Goal:**
    - o   Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems involving converting numbers into equivalent forms and comparing and ordering numbers.
    - o   Communicate scale and order of numbers using symbols, diagrams, number lines, and language as appropriate.

Students will know...
sets and subsets of real numbers, including counting or natural numbers, whole numbers, integers, rational numbers, and irrational numbers; scientific notation is used to communicate numbers efficiently

Students will be skilled at...
creating a visual representation to describe relationships between sets of numbers; approximating the value of an irrational number; locating an approximation of an irrational number on a number line; converting between scientific notation and decimal notation; ordering a set of real numbers arising from mathematical and real-world contexts; solving problems using operations of rational numbers

UNIT 2: EQUATIONS AND INEQUALITIES

TIMELINE: 2 WEEKS - 1ST GRADING PERIOD

The learners begin this unit by writing real-world problem situations to represent given equations or inequalities. They also write one-variable equations or inequalities with variables on both sides that represent given real-world problem situations. This translation between verbal and algebraic forms builds understanding of multiple representations of the mathematical relationships. Then, the learners model and solve, with real objects or manipulatives and tools, algebraic equations and inequalities to represent real-world problems. Finally, as an application of personal financial literacy, the learners calculate simple and compound interest in real-world situations.

- ■ **Transfer Goal:**
    - o   Use the four-step problem-solving model to solve real-world problems related to geometry and personal financial literacy.
    - o   Communicate algebraic relationships using multiple representations, including symbols and language as appropriate.

Students will know…
relevance of constants and variables in inequalities and equations; the difference between simple and compound interest

Students will be skilled at…
writing one-variable, two-step equations and inequalities to represent constraints or conditions within problems; representing solutions for one-variable, two-step equations and inequalities on number lines; writing a corresponding real-world problem given a one-variable, two-step equation or inequality; modeling and solving one-variable, two-step equations and inequalities; determining if the given value(s) make(s) one-variable, two-step equations and inequalities true; writing one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants; writing a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants; modeling and solving one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants; calculating and comparing simple interest and compound interest earnings.

Unit 3: Proportionality

Timeline: 4 weeks - 2nd Grading Period

This unit of study includes a focus on ratios, rates, proportionality, similarity and scale drawings. The learners compare given quantities to determine the corresponding relationship and begin to find and use unit rates to solve problems. Percent increase and decrease is calculated with a percent proportion while the learner apply concepts of personal financial literacy. The unit concludes with an exploration of similarity and scale drawings, emphasizing the ratio of corresponding sides of similar shapes are proportional.

- **Transfer Goal:**
  - o Use the four-step problem-solving model to solve real-world problems related to scale factor and unit rate.
  - o Communicate algebraically the relationship between corresponding values of similar figures.

Students will know…
dilation is a transformation that produces a similar shape as a result of the application of a given scale factor; corresponding sides of similar shapes are proportional

Students will be skilled at…
calculating unit rates from rates in mathematical and real-world problems; solving problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems; converting between measurement systems, including the use of proportions and the use of rates; generalizing the critical attributes of similarity, including ratios within and between similar shapes; solving mathematical and real-world problems involving similar shape and scale drawings; generalizing that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation; comparing and contrasting the attributes of a shape and its dilation(s) on a coordinate plane; using an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation; modeling the effects on linear and area measurements of dilated two-dimensional shapes

UNIT 4: MULTIPLE REPRESENTATIONS

TIMELINE: 2 WEEKS - 2ND GRADING PERIOD

During this unit of study, learners explore non-proportional and proportional relationships. Data in the form of tables and graphs are used to determine the rate of change or slope and y-intercept, and the significance of each, in mathematical and real-world problems. Similar right triangles are used to develop the understanding of slope. Connections are developed through multiple representations of linear relationships, including verbal, numerical, tabular, and graphical representations. As the learners compare non-proportional to proportional situations, various representations are used to communicate the key features.

- **Transfer Goal:**
  - o Select tools, including algebraic representations of linear relationships, to solve problems.
  - o Communicate relationships in mathematical and real-world situations using multiple algebraic representations.

Students will know…
slope is the rate of change of one variable with respect to another in a problem situation; related multiple representations communicate the same relationship; proportional and non-proportional situations can be distinguished

Students will be skilled at…
determining the rate of change or slope and y-intercept in mathematical and real-world problems; writing an equation in the form y=mx+b to model a linear relationship using verbal, numerical, tabular, and graphical representations; distinguishing between proportional and non-proportional situations using tables, graphs, and equations; representing linear proportional situations with tables, graphs, and equations; representing linear non-proportional situations with tables, graphs, and equations; graphing proportional relationships; interpreting the unit rate as the slope of the line; identifying examples of proportional and non-proportional functions that arise from mathematical and real-world problems

UNIT 5: 2D GEOMETRIC RELATIONSHIPS

TIMELINE: 5 WEEKS - 2ND - 3RD GRADING PERIOD

This unit of study focuses on 2-dimensional geometric shapes. The learners explore the relationship between pi, diameter, and circumference of a given circle. Building upon their experience with area of 2-dimensional figures, learners solve problems with area of composite shapes. Then, they explore angle relationships, including writing and solving equations related to such geometric concepts. Finally, the learners transform geometric figures on the coordinate plane and use algebra to describe the effects.

- ■ **Transfer Goal:**
    - o Select tools including coordinate planes and patty paper to solve problems related to transform of two-dimensional shapes.
    - o Display, explain, and justify algebraic representations related to geometric transformations of two-dimensional shapes.

Students will know…
transformations that preserve congruence and those that do not

Students will be skilled at…
calculating the circumference and area of circles; determining the area of composite figures; generalizing the properties of orientation and congruence of rotations, reflections, translations, and dilations; generalizing that the ratio of corresponding sides of similar shapes are proportional; comparing and contrasting the attributes of a shape and its dilation(s) on a coordinate plane; using an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation; differentiating between transformations that preserve congruence and those that do not; modeling the effects on linear and area measurements of dilated two-dimensional shapes

UNIT 6: 3D GEOMETRIC RELATIONSHIPS

TIMELINE: 4 WEEKS - 3RD GRADING PERIOD

This unit includes the study of surface area and volume. The learners utilize nets to make connections to formulas for lateral and total surface area. And, building upon their understanding of area, learners solve problems with surface area of rectangular prisms, triangular prisms, and cylinders. Then, the learners explore the relationships between rectangular pyramids and prisms as well as the relationships between triangular pyramids and prisms. Finally, learners model and solve problems related to the volume of cylinders, cones, and spheres.

- ■ **Transfer Goal:**
    - o   Use the four-step problem-solving model to solve problems related to surface area and volume.
    - o   Communicate relationships between the models, formulas, and solutions using symbols, diagrams, graphs, and language as appropriate.

Students will know…
the relationship between nets and 3-dimensional figures

Students will be skilled at…
modeling the relationship between the volume of a rectangular prism and a rectangular pyramid having both congruent bases and heights that connect that relationship to the formulas; explaining verbally and symbolically the relationship between the volume of a triangular prism and a triangular pyramid having both congruent bases and heights and connect that relationship to the formulas; solving problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids; solving problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net; describing the volume formula $V = Bh$ of a cylinder in terms of its base area and its height; modeling the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect that relationship to the formulas; solving problems involving the volume of cylinders, cones, and spheres; using previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders

UNIT 7: DATA ANALYSIS AND PROBABILITY

TIMELINE: 4 WEEKS - 3RD - 4TH GRADING PERIOD

This unit involves the study of sample spaces, simple and compound events and the analysis of data organized into graphs. First, learners determine the probability for simple and compound events using lists and tree diagrams as well as design and carry out probability simulations to make predictions about a given population. The study of data analysis includes solving problems and making predictions and inferences with bar graphs, dot plots, box plots, and circle graphs.

- ■ **Transfer Goal:**
  - o   Use the four-step problem-solving model to solve real-world problems related to data analysis.
  - o   Display, explain, and justify data organized into graphs and charts.

Students will know…
the difference between theoretical and experimental probability; the difference between simple and compound events; the qualifications for a random sample

Students will be skilled at…
representing sample spaces for simple and compound events using lists and tree diagrams; selecting and using different simulations to represent simple and compound events with and without technology; making predictions and determine solutions using experimental data for simple and compound events; making predictions and determine solutions using theoretical probability for simple and compound events; finding the probabilities of a simple event and it complement and describe the relationship between the two; using data from a random sample to make inferences about a population; solving problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents; solving problems using qualitative and quantitative predictions and comparisons from simple experiments; determining experimental and theoretical probabilities related to simple and compound events using data and sample spaces; comparing two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads; using data from a random sample to make inferences about a population; comparing two populations based on data in random samples from these populations including informal comparative inferences about differences between the two populations; simulating generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected

Unit 8: Personal Finance

Timeline: 3 weeks - 4th Grading Period

This unit involves the study of personal financial literacy. The learners calculate sales and income tax as well as simple and compound interest.   In order to Develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor, the learners investigate hwo to mathematics to plan for a successful financial future. The unit continues as the learners estimate the cost of college and explore methods to save for college, including repaying student loans. Finally, the unit concludes with the opportunity to analyze financial situations to determine if they represent financially responsible decisions.

- ■ **Transfer Goal:**
    - o   Use the four-step problem-solving model to solve real-world problems related to personal financial literacy.
    - o   Display, explain, and justify financial decision making processes.

Students will know...
interest rate and loan length each impacts the cost of credit; methods for saving money; advantages and disadvantages of different payment methods; benefits and costs of financial responsibility

Students will be skilled at...
calculating the sales tax for a given purchase and calculate income tax for earned wages; identifying the components of a personal budget, including income; planned savings for college, retirement, and emergencies, taxes; and fixed and variable expenses, and calculate what percentage each category comprises of the total budget; creating and organizing a financial assets and liabilities record and construct a net worth statement; using a family budget estimator to determine the minimum household budget and average hourly wage needed for a family to meet its basic needs in the student's city or another large city nearby; calculating and comparing simple interest and compound interest earnings; analyzing and comparing monetary incentives, including sales, rebates, and coupons; solving real world problems comparing how interest rate and loan length affect the cost of credit; calculating the total cost of repaying a loan, including credit cards and easy access loans, under various rates of interest and over different periods using an online calculator; explaining how small amounts of money invested regularly, including money saved for college and retirement, grow over time; calculating and comparing simple interest and compound interest earnings; identifying and explaining the advantages and disadvantages of different payment methods; analyzing situations to determine if they represent financially responsible decisions and identify the benefits of financial responsibility and the cost of financial responsibility; estimating the cost of a two year and four year college education, including family contribution and devise a periodic savings plan for accumulating the money needed to contribute to the total cost attendance for at least the first year of college

Unit 9: Pythagorean Theorem

Timeline: 1 week - 4th Grading Period

This final unit in 8th grade mathematics involves the study of the Pythagorean Theorem. The learners begin by using models and diagrams to explain the Pythagorean Theorem, then use the relationship and its converse to solve problems. The coordinate plane is integrated as the learners use the Pythagorean Theorem to calculate the distance between two given points.

- ■ **Transfer Goal:**
    - o   Use the four-step problem-solving model to solve real-world problems with the Pythagorean Theorem.
    - o   Select tools, including the Pythagorean Theorem and its converse, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
    - o   Communicate the relationships involved with the Pythagorean Theorem using multiple representations, including symbols, diagrams, graphs, and language as appropriate.

Students will know…
the relationships within the Pythagorean Theorem that make the rule true

Students will be skilled at…
using models and diagrams to explain the Pythagorean Theorem; using the Pythagorean Theorem and its converse to solve problems; determining the distance between two points on a coordinate plane using the Pythagorean theorem