Mathematics (PreK – 8th Grade)
Academic Content & Skills Summary
Peru Elementary School District 124

In an effort to communicate clear academic expectations to students, parents and the local community, Peru Elementary School District 124 provides Academic Content and Skills Summaries from preschool through eighth grade in the areas of mathematics, language arts, science, social studies, technology, art, music and physical education.

Following is a simple summary of what our children should know and be able to do at each grade level in the area of Mathematics. All children can learn, even if not at the same pace or in the same way, and ultimately these general skills and content items are what we will strive to accomplish with the assistance of our parents at home.

Pre-K students will:
- Count to 30, count out objects through 10
- Identify numbers one through ten
- Sort, classify, and identify objects that show different colors and shapes
- Be exposed to simple and complex patterns
- Be introduced to the concepts of more, less, and equal

Kindergarten students will:
- Know number names, write numbers 0-20, and count sequences (0-100)
- Count to tell the number of objects
- Compare numbers
- Understand addition as putting together and adding to, and subtraction as taking apart and taking from (fluently able to add and subtract within 5)
- Work with numbers 11-19 to gain foundations for place value (does exceed with Calendar Math)
- Describe and compare measurable attributes (ie: length/weight, more/less)
- Classify objects by color, shape, and size and count the number of objects in each category
- Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders and spheres)
- Analyze, compare, create and compose shapes

1st Grade students will:
- Add and subtract within 20
- Represent and solve problems involving addition and subtraction
- Understand and apply properties of operations and the relationship between addition and subtraction
- Solve simple addition and subtraction word problems
- Add three whole numbers whose sum is less than or equal to 20
- Work with addition and subtraction equations

1st Grade students will (continued):

- Extend the counting sequence
- Understand place value, tens and ones and use place value properties to add and subtract
- Count to 120, starting at any number less than 120
- Order three objects by length; compare the lengths of two objects indirectly by using a third object.
- Express the length of an object as a whole number of length units

2nd Grade students will:

- Add and subtract within 1000, and explain why the addition and subtraction strategies work.
- Add and subtract using mental strategies
- Skip-count by 5's, 10's, and 100's
- Read and write numbers using base-ten numerals, number names, and expanded form
- Compare two- and three-digit numbers using <, >, and = symbols
- Represent and solve problems involving addition and subtraction
- Work with equal groups of objects to gain foundations for multiplication
- Understand place value and use place value properties to add and subtract
- Measure, identify, and estimate lengths in standard units
- Tell and write time
- Identify coins, count, and solve money problems
- Reason with shapes and their characteristics

3rd Grade students will:

- Understand concepts of area and relate area to multiplication and addition
- Understand properties of multiplication and the relationship between multiplication and division
- Multiply and divide within 100
- Solve problems involving the four operations (addition, subtraction, multiplication, and division) and identify and explain patterns
- Develop an understanding of fractions
- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects
- Understand and recognize shapes in different categories

4th Grade students will:

- Use the four operations (addition, subtraction, multiplication, and division) with whole numbers to solve computation and multi-step word problems.
- Demonstrate place value understanding for multi-digit whole numbers
- Apply place value understanding to perform multi-digit arithmetic
- Extend understanding of fraction equivalence and ordering
- Using previous knowledge of the operations (addition, subtraction, multiplication, and division) of whole numbers to build fractions from unit fractions
- Understand and compare how decimals and fractions relate
- Expand knowledge of 2-dimensional geometry including angles, lines, area and perimeter

5th Grade students will:

- Understand the place value system using whole numbers and decimals
- Round or use compatible numbers in order to compute mentally
- Add, subtract, multiply and divide whole numbers, decimals, and fractions
- Analyze patterns and relationships of numbers
- Evaluate expressions using Order of Operations
- Understand concepts of volume and relate volume to multiplication and addition

6th Grade students will:

- Use the four operations of addition, subtraction, multiplication, and division with the set of rational numbers to solve real-world problems
- Understand ratio concepts and use ratio reasoning to solve problems
- Understand that positive and negative numbers are quantities having opposite value and are equidistant from zero on a number line
- Write, read, and evaluate algebraic expressions
- Reason about and solve one variable equations and inequalities

7th Grade students will:

- Use proportional relationships to solve real-life mathematical problems with ratios, rates, and percents
- Use graphs and tables to interpret proportional relationships
- Apply and extend operations with fractions to add, subtract, multiply, and divide
- Apply and extend operations with integers to add, subtract, multiply, and divide
- Solve real-life mathematical problems using numerical and algebraic expressions, equations, and inequalities

8th Grade students will:

- Demonstrate the ability to solve equations with one variable and equations with variables on both sides
- Apply the understanding of algebra to solve equations with exponents using all operations
- Evaluate equations that include square roots and cube roots
- Understand the rules for writing equations using functions
- Create an equation for a linear function and identify the equation $y = mx + b$
- Compare the difference between two separate linear functions based on their graphs
- Apply the relationship between initial value and rate of change to graph a linear function
- Transform geometric shapes using Translations, Reflections, and Rotations.
- Prove the Pythagorean Theorem using previous understanding of triangles; prove the converse of the Pythagorean Theorem