



# **Pine Grove Area**

## SCHOOL DISTRICT

### **Mathematics Curriculum**

### **Kindergarten**

**January 21, 2010**

#### **I. PHILOSOPHY**

The Kindergarten mathematics course of the Pine Grove Area School District has been structured to systematically introduce the five core mathematical concepts including numbers and operations, measurement, geometry, algebraic concepts and data analysis and probability. Exposure to and practice of these skills will provide a foundation on which to build an understanding of more complex mathematical concepts. Developmentally appropriate activities will include many opportunities for “hands-on” learning and integration into other curricular areas. The course will allow for the accommodation of many learning styles, motivational levels, and academic abilities.

## **II. CORE CONCEPTS**

1. Numbers and Operations – Ability to understand numbers, number systems and number relationships
2. Computation and Estimation – Application of estimates, addition and subtraction
3. Measurement and Estimation – Making comparisons, time to the hour, use of non-standard units
4. Mathematical Reasoning and Connections- Making, checking, and verifying predictions
5. Mathematical Problem Solving and Communication- Using appropriate problem solving strategies
6. Statistics and Data Analysis- Gathering, organizing, and displaying data using graphs
7. Probability and Predictions- Analyzing data using concepts of largest, smallest, least often, etc.
8. Algebra and Functions – Ability to recognize and extend patterns, explain mathematical symbols
9. Geometry – Ability to name, label and describe two and three dimensional shapes
10. Trigonometry- Ability to identify right angles
11. Calculus- Ability to order numbers from least to most and greatest value

### **III. COURSE OF STUDY**

**A. Course Name:** Mathematics

**B. Grade Level:** Kindergarten

**C. Length of Course:** Full year

**1. Frequency:** Once daily

**2. Duration:** 80 minutes

**D. Academic Level:** Kindergarten

**E. Credits:** 0

**F. Prerequisites:** none

**G. Course Description:**

The kindergarten mathematics course will lay the foundation for future math skills in the five core areas of mathematics. Emphasis will be placed on meeting each student's academic needs, learning styles and readiness. Accommodations and modifications will be made for those students who need additional assistance and/or remediation in specific areas.

**IV. CONTENT: Grade K Mathematics**

**CORE CONCEPT 1: Numbers and Operations**

**MAJOR OBJECTIVE: Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<p><b>PA Standard 2.1.3.A</b> Count using whole numbers (to 10,000) and by 2's, 3's, 5's 10's and 100's</p>	<p>Teacher will guide student to:</p> <p>Recognize and write numbers to 100.</p> <p>Count orally 1-100 using whole numbers</p> <p>Count by 2's, 5's, and 10's.</p> <p>Write numbers 1-20 using whole numbers</p>	<p>Teacher evaluation of:</p> <p>Student counting orally (with checklist/rubric)</p> <p>Student written work in counting (with checklist/rubric)</p>	<p>Textbook resources</p> <p>Calendar</p> <p>Number Lines</p> <p>Number cards and charts</p> <p>Counting songs</p> <p>Trade books</p> <p>Math journal</p>
<p><b>PA STANDARD 2.1.3.H</b> Demonstrate an understanding of one-to-one correspondence</p>	<p>Teacher will guide student to:</p> <p>Count objects using one-to-one correspondence (in sets of 20)</p>	<p>Teacher evaluation of:</p> <p>Student counting using one-to-one correspondence</p>	<p>Textbook resources</p> <p>Concrete counting objects (cubes, blocks, counters, etc..)</p> <p>Counting songs</p> <p>Trade books</p> <p>Math journal</p>
<p><b>PA STANDARD 2.1.3.G</b> Use concrete objects to count, order and group.</p>	<p>Teacher will guide student to:</p> <p>Use manipulatives to count, order, and group numbers</p>	<p>Teacher evaluation of:</p> <p>Student responses in class practice</p> <p>Student counting, ordering, and grouping manipulatives such as teddy bears, counters, etc.</p>	<p>Textbook resources</p> <p>Paper shapes</p> <p>Stencils</p> <p>Trade books</p> <p>Math journal</p>

**CONTENT: Grade K Mathematics****CORE CONCEPT 1: Numbers and Operations****MAJOR OBJECTIVE: Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.**

<b>CURRICULUM STANDARD:</b>			
<b>State Standard/Student Expectation</b>	<b>Specific Content</b>	<b>Assessments</b>	<b>Resources/Materials</b>
<p><b>PA STANDARD 2.1.3.E</b> Count, compare and make change using a collection of coins and one-dollar bills.</p>	<p>Teacher will guide student to:</p> <p>Identify coins including pennies, nickels, dimes, and quarters</p> <p>Name value of coins associated with specific coins</p> <p>Show and describe specific attributes of each coin</p>	<p>Teacher evaluation of:</p> <p>Student identification of coins (via rubric)</p> <p>Student association of coin value with specific coins (via rubric)</p> <p>Student work in learning centers</p>	<p>Textbook resources</p> <p>Pennies, nickels, dimes, quarters (real and plastic)</p> <p>Worksheet</p> <p>Math journal</p>
<p><b>PA STANDARD 2.1.3.B</b> Use whole numbers and fractions to represent quantities.</p>	<p>Teacher will guide student to:</p> <p>Demonstrate how to show the correct number of objects to match a given numeral between 0-20</p> <p>Demonstrate counting and orally reciting the correct number of objects in a set up to 20</p>	<p>Teacher evaluation of:</p> <p>Student demonstration of correct number of objects</p> <p>Student counting of numbers</p>	<p>Textbook resources</p> <p>Concrete counting objects (cubes, blocks, counters, etc.)</p> <p>Worksheets</p> <p>Math journal</p>
<p><b>PA STANDARD 2.1.3.G</b> Use concrete objects to count, order and group</p>	<p>Teacher will guide student to:</p> <p>Organize numerals 0-20 in proper order</p> <p>Sequence numbers in proper order</p> <p>Utilize number cards to place numerals in correct order</p>	<p>Teacher evaluation of:</p> <p>Student practice of number order (via rubric)</p>	<p>Textbook resources</p> <p>Number cards</p> <p>Number line</p> <p>Math journal</p> <p>Numeral charts</p>

**CONTENT: Grade K Mathematics****CORE CONCEPT 1: Numbers and Operations****MAJOR OBJECTIVE: Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<b>PA STANDARD 2.1.3.I</b> Apply place-value concepts and numeration to counting, ordering and grouping.	Teacher will guide student to:  Demonstrate how to determine directionality of a line  Count objects in a line according to ordinal position  Locate and name specific ordinal positions	Teacher evaluation of:  Students correctly identifying specific ordinal positions first through tenth by marking or naming	Textbook resources  Concrete objects  Calendar  Trade Books  Learning Center activities  Math journal
<b>PA STANDARD 2.1.3.F</b> Apply number patterns (even and odd) and compare values of numbers on the hundred board.	Teacher will guide student to:  Use a hundred board to find patterns and values of numbers.  Demonstrate how to tell which is more/less in a given set of numbers  Label more than/less than	Teacher evaluation of:  Student responses in class practice.  Student performance during comparisons in small group, individually and whole group (use of rubric)	Textbook resources  Hundred Board  Concrete objects  Trade Books  Learning Center activities  Math journal

**CONTENT: Grade K Mathematics**

**CORE CONCEPT 1: Numbers and Operations**

**MAJOR OBJECTIVE: Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<b>PA STANDARD 2.1.3.C</b> Represent equivalent forms of the same number through the use of concrete objects, drawings, word names and symbols.	Teacher will guide student to:  Draw corresponding number of shapes to go with numerical values  Write word names associated with numerals  Identify and match word names with numerals and pictures	Teacher evaluation of:  Math journal activities  Student response during whole group activity	Textbook resources  Concrete objects  Trade Books  Learning Center activities  Math journal

**CONTENT: Grade K Mathematics****CORE CONCEPT 1: Numbers and Operations****MAJOR OBJECTIVE: Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.**

<b>CURRICULUM STANDARD:</b>			
<b>State Standard/Student Expectation</b>	<b>Specific Content</b>	<b>Assessments</b>	<b>Resources/Materials</b>
<p><b>PA STANDARD 2.1.3.J</b> Estimate, approximate, round or use exact numbers as appropriate.</p>	<p>Teacher will guide student to:</p> <p>Make a reasonable estimate on a number of objects</p> <p>Orally state estimate as a number</p> <p>Orally state a reason for the estimate</p> <p>Count objects to check estimate</p>	<p>Teacher evaluation of:</p> <p>Accuracy of student estimates</p> <p>Accuracy of reasoning behind estimates</p>	<p>Textbook resources</p> <p>Unifix cubes or other counters</p> <p>Concrete objects</p> <p>Trade Books</p> <p>Learning Center activities</p> <p>Math journal</p>
<p><b>PA STANDARD 2.1.3.D</b> Use drawings, diagrams or models to show the concept of fraction as part of a whole.</p>	<p>Teacher will guide student to:</p> <p>Separate objects into groups of 2</p>	<p>Teacher evaluation of:</p> <p>Student separating objects into partner-groups of 2</p>	<p>Textbook resources</p> <p>Counters</p> <p>Concrete objects</p> <p>Math journal</p>
<p><b>PA STANDARD 2.1.3.B</b> Use whole numbers and fractions to represent quantities.</p>	<p>Teacher will guide student to:</p> <p>Describe and apply the concept of equal parts</p> <p>Divide various shapes into equal parts called “one-half”</p>	<p>Teacher evaluation of:</p> <p>Student responses in class practice</p> <p>Student ability to apply concept of equal parts</p>	<p>Textbook resources</p> <p>Paper shapes</p> <p>Stencils</p> <p>Trade books</p> <p>Math journal</p>

**CONTENT: Grade K Mathematics**

**CORE CONCEPT 1: Numbers and Operations**

**MAJOR OBJECTIVE: Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.**

<b>CURRICULUM STANDARD:</b>			
<b>State Standard/Student Expectation</b>	<b>Specific Content</b>	<b>Assessments</b>	<b>Resources/Materials</b>
<b>PA STANDARD 2.1.3.K</b> Describe the inverse relationship between addition and subtraction.	Teacher will guide student to:  Manipulate counters to show the addition and subtraction problems.	Teacher evaluation of:  Student ability to show addition or subtraction problems using counters.	Textbook resources  Unifix cubes or other counters  Concrete objects  Learning Center activities  Math journal
<b>PA STANDARD 2.1.3.L</b> Demonstrate knowledge of basic facts in four basic operations.	Teacher will guide student to:  Use counters, pictures, or other manipulative to demonstrate operations of addition and/or subtraction.	Teacher evaluation of:  Student ability to apply the concepts of addition and subtraction.	Textbook resources  Counters  Concrete objects  Math journal

**CONTENT: Grade K Mathematics****CORE CONCEPT 2: Computation and Estimation****MAJOR OBJECTIVE: Application of estimates, addition and subtraction**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<b>PA STANDARD 2.2.3.A</b> Apply addition and subtraction in everyday situations using concrete objects.	Teacher will guide student to:  Demonstrate joining 2 sets of counters or objects in order to get the sum (addition)  Demonstrate separating one set of numbers in order to get the answer (subtraction)  While performing the addition and subtraction with manipulatives, orally state corresponding problem using math terminology (“2 plus 3 equals 5”)  While performing the addition and subtraction problems with manipulatives, write corresponding problem using math symbols ( $2+3=5$ )	Teacher evaluation of:  Student correctly calculating addition and subtraction problems using manipulatives, drawings, counters  Student correctly completing learning center and in-class work on addition and subtraction  Student addition and subtraction (use of rubric)	Textbook resources  Counters  Concrete objects  Trade books  Worksheets  Math journal

**CONTENT: Grade K Mathematics****CORE CONCEPT 3: Measurement and Estimation****MAJOR OBJECTIVE: Demonstrate an understanding of measurable attributes of objects and figures, as well as, the units, systems and processes associated with measurement**

<b>CURRICULUM STANDARD:</b>			
<b>State Standard/Student Expectation</b>	<b>Specific Content</b>	<b>Assessments</b>	<b>Resources/Materials</b>
<b>PA STANDARD 2.3.3.D</b> Tell time (analog and digital) to the minute.	Teacher will guide student to:  Demonstrate understanding of hour hand and minute hand in order to tell time to the hour	Teacher evaluation of:  Student correctly telling time to the hour (use of checklist)  Written assessment on telling time to the hour	Textbook resources  Large and small analog clocks  Worksheet  Math journal
<b>PA STANDARD 2.3.3.A</b> Compare measurable characteristics of different objects on the same dimensions (e.g., time, temperature, area, length, weight, capacity, perimeter).	Teacher will guide student to:  Explain and demonstrate how to estimate lengths and heights of larger objects up to 10 units, using concrete objects to represent non-standard units (blocks, cubes, crayons, etc..)	Teacher evaluation of:  Student estimating of objects in classroom, on worksheets and written assessment	Textbook resources  Objects to measure  Trade books  Worksheets  Math journal
<b>PA STANDARD 2.3.3.G</b> Estimate and verify measurements.	Teacher will guide student to:  Estimate lengths and heights of larger objects up to 10 units, using concrete objects to represent non-standard units (blocks, cubes, crayons, etc..)	Teacher evaluation of:  Student estimating and measuring objects in classroom, on worksheets and written assessment  Math journal activities	Textbook resources  Objects to measure  Trade books  Worksheets  Math journal

**CONTENT: Grade K Mathematics**

**CORE CONCEPT 3: Measurement and Estimation**

**MAJOR OBJECTIVE: Demonstrate an understanding of measurable attributes of objects and figures, as well as, the units, systems and processes associated with measurement**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<b>PA STANDARD 2.3.3.E</b> Determine the appropriate unit of measure.	Teacher will guide student to:  Demonstrate and explain how to measure using various nonstandard units such as hands, feet, paper clips, etc.	Teacher evaluation of:  Use of proper unit of measurement  Math journal activities	Textbook resources  Objects to measure  Concrete objects  Worksheets  Math journal

**CONTENT: Grade K Mathematics****CORE CONCEPT 3: Measurement and Estimation****MAJOR OBJECTIVE: Demonstrate an understanding of measurable attributes of objects and figures, as well as, the units, systems and processes associated with measurement**

<b>CURRICULUM STANDARD:</b>			
<b>State Standard/Student Expectation</b>	<b>Specific Content</b>	<b>Assessments</b>	<b>Resources/Materials</b>
<p><b>PA STANDARD 2.3.3B</b> Determine the measurement of objects with non-standard and standard units (e.g., US customary and metric).</p>	<p>Teacher will guide student to:</p> <p>Use concrete objects, situations, or pictures to show the meaning of the following terms: hotter/colder, longer/shorter, taller/shorter, heavier/lighter, same/different, bigger/smaller</p>	<p>Teacher evaluation of:</p> <p>Student measurement of objects in classroom, on worksheets and written assessment</p>	<p>Textbook resources</p> <p>Objects to measure</p> <p>Concrete objects</p> <p>Worksheets</p>
<p><b>PA STANDARD 2.3.3.H</b> Demonstrate that a single object has different attributes that can be measured in different ways (e.g., length, mass, weight, time, area, temperature, capacity, perimeter).</p>	<p>Teacher will guide student to:</p> <p>Investigate the different ways to measure the various attributes of an object.</p> <p>Select appropriate tools for the attribute being measured (clock to tell time, scale to weigh, measuring cups to help bake a cake.)</p>	<p>Teacher evaluation of:</p> <p>Students during whole group discussion</p> <p>Individuals during small group work/center work</p> <p>Math journals</p>	<p>Textbook resources</p> <p>Objects to measure</p> <p>Concrete objects</p> <p>Worksheets</p>
<p><b>PA STANDARD 2.3.3.F</b> Use concrete objects to determine area and perimeter.</p>	<p>Teacher will guide student to:</p> <p>Demonstrate how to measure area and perimeter using various nonstandard units such as blocks, hands, feet, paper clips, etc.</p>	<p>Teacher evaluation of:</p> <p>Students during whole group discussion/activity</p> <p>Individuals during small group work/center work</p> <p>Math journals</p>	<p>Textbook resources</p> <p>Objects to measure</p> <p>Concrete objects</p> <p>Worksheets</p>

**CONTENT: Grade K Mathematics**

**CORE CONCEPT 4: Mathematical Reasoning and Connections**

**MAJOR OBJECTIVE: Demonstrate an understanding of making, checking, and verifying predictions**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<b>PA STANDARD 2.4.3.A</b> Make, check and verify predictions about the quantity, size and shape of objects and groups of objects.	Teacher will guide student to:  Estimate/predict and check for accuracy in various situations regarding quantity, size, number and shape of numerical value	Teacher evaluation of:  Students during whole group discussion/activity  Individuals during small group work/center work  Math journals	Textbook resources  Manipulatives  Worksheets  Math journal
<b>PA STANDARD 2.4.3.B</b> Use measurements in everyday situations (e.g., determine the geography of the school building).	Teacher will guide student to:  Utilize right and left, up and down directionality skills to navigate through school building	Teacher evaluation of:  Students during whole group discussion/activity  Individuals during small group work/center work  Math journals	Textbook resources  Manipulatives  Paper, pencils, crayons, glue  Worksheets  Math journal

**CONTENT: Grade K Mathematics****CORE CONCEPT 5: Mathematical Problem Solving and Communication****MAJOR OBJECTIVE: Demonstrate an understanding of patters, relationships, and functions**

<b>CURRICULUM STANDARD:</b>			
<b>State Standard/Student Expectation</b>	<b>Specific Content</b>	<b>Assessments</b>	<b>Resources/Materials</b>
<p><b>PA STANDARD 2.5.3.A</b> Use appropriate problem-solving strategies (e.g., guess and check, working backwards).</p>	<p>Teacher will guide student to:</p> <p>Solve a simple story problem and explain the process</p> <p>Discuss story problems and practice solving them by applying the following strategies:</p> <ol style="list-style-type: none"> <li>1. acting it out</li> <li>2. drawing a picture</li> <li>3. using manipulatives</li> <li>4. looking for patterns</li> </ol>	<p>Teacher evaluation of:</p> <p>Student ability to recognize and extend patterns via checklist or rubric</p> <p>Students applying various strategies to solve problems</p>	<p>Textbook resources</p> <p>Manipulatives</p> <p>Worksheets</p> <p>Math journal</p>
<p><b>PA STANDARD 2.5.3.B</b> Determine when sufficient information is present to solve a problem and explain how to solve a problem.</p>	<p>Teacher will guide student to:</p> <p>Solve story problems for with addition and subtraction number sentences, up to sums of 10 by using pictures , numbers, words and symbols</p>	<p>Teacher evaluation of:</p> <p>Teacher observation of students applying addition and subtraction in story situations using pictures, numbers and symbols</p> <p>Student math journal work</p>	<p>Textbook resources</p> <p>Manipulatives</p> <p>Paper, pencils, crayons, glue</p> <p>Worksheets</p> <p>Math journal</p>
<p><b>PA STANDARD 2.5.3.C</b> Select and use an appropriate method, materials and strategy to solve problems, including mental mathematics, paper and pencil and concrete objects.</p>	<p>Teacher will guide student to:</p> <p>Discuss story problems and practice solving them by applying the following strategies:</p> <ol style="list-style-type: none"> <li>1. acting it out</li> <li>2. drawing a picture</li> <li>3. using manipulatives</li> <li>4. looking for patterns</li> </ol>	<p>Teacher evaluation of:</p> <p>Students applying various strategies to solve problems</p>	<p>Textbook resources</p> <p>Manipulatives</p> <p>Math journal</p> <p>Worksheets</p>

**CONTENT: Grade K Mathematics****CORE CONCEPT 6: Statistics and Data Analysis****MAJOR OBJECTIVE: Ability to organize and compare data, predict the likelihood of events**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<b>PA STANDARD 2.6.3.A</b> Gather, organize and display data using pictures, tallies, charts, bar graphs and pictographs.	Teacher will guide student to:  Construct charts and graphs (pictographs, bar graphs) to represent a set of data (birthdays, favorite colors, pets, family members)	Teacher evaluation of:  Student ability to create charts and graphs from a set of data using a rubric	Textbook resources  Manipulatives  Counters  Drawing materials/chart paper  Trade books  Worksheets  Math journal
<b>PA STANDARD 2.6.3.B</b> Formulate and answer questions based on data shown on graphs.	Teacher will guide student to:  Demonstrate understanding of a graph by answering questions regarding a graph.	Teacher evaluation of:  Student answers to class discussion  Math journal answers	Textbook resources  Manipulatives  Trade books  Worksheets  Math journal
<b>PA STANDARD 2.6.3.C</b> Predict the likely number of times a condition will occur based on analyzed data.	Teacher will guide student to:	Teacher evaluation of:  Students making predictions and verifying quantity, size, shape, of objects	Textbook resources  Manipulatives  Trade books  Worksheets  Math journal

**CONTENT: Grade K Mathematics****CORE CONCEPT 7: Probability and Predictions****MAJOR OBJECTIVE: Ability to analyze data using concepts of largest, smallest, least often, etc.**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<b>PA STANDARD 2.7.3.A</b> Predict and measure the likelihood of events and recognize that the results of an experiment may not match predicted outcomes.	Teacher will guide student to:  Identify necessary information in story problem  Describe other information (if needed) to solve story problem	Teacher evaluation of:  Student identification of necessary information in story problem  Student ability to recognize missing information in story problem	Textbook resources  Manipulatives  Counters  Drawing materials  Trade books  Worksheets  Math journal
<b>PA STANDARD 2.7.3.D</b> Analyze data using the concepts of largest, smallest, most often, least often and middle.	Teacher will guide student to:  Determine the largest and smallest groups in a set of objects	Teacher evaluation of:  Student ability to recognize largest and smallest group with given data	Textbook resources  Manipulatives  Worksheets  Math journal

**CONTENT: Grade K Mathematics****CORE CONCEPT 8: Algebra and Functions****MAJOR OBJECTIVE: Demonstrate an understanding of patters, relationships, and functions**

<b>CURRICULUM STANDARD:</b>			
<b>State Standard/Student Expectation</b>	<b>Specific Content</b>	<b>Assessments</b>	<b>Resources/Materials</b>
<b>PA STANDARD 2.8.3.A</b> Recognize, describe, extend, create and replicate a variety of patterns including attribute, activity, number and geometric patterns.	Teacher will guide student to:  Demonstrate how to recognize and extend patterns up to 4 objects	Teacher evaluation of:  Student ability to recognize and extend patterns via checklist or rubric	Textbook resources  Manipulatives  Worksheets  Math journal
<b>PA STANDARD 2.8.3.B</b> Use concrete objects and trial and error to solve number sentences and check if solutions are sensible and accurate	Teacher will guide student to:  Show $2+3=5$ , $5-3=2$ , etc...using concrete objects  Write number sentences using mathematical symbols including +, -, and =	Teacher evaluation of:  Student ability to use mathematical symbols correctly  Student ability to name mathematical symbols  Student use of manipulatives to create addition and subtraction number sentences	Textbook resources  Manipulatives  Paper, pencils, crayons, glue  Worksheets  Math journal
<b>PA STANDARD 2.8.3.F</b> Explain the meaning of solutions and symbols.	Teacher will guide student to:  Demonstrate recognition of mathematical symbols including +, - and =	Teacher evaluation of:  Student ability to recognize mathematical symbols	Textbook resources  Manipulatives  Paper, pencils, crayons, glue  Worksheets  Math journal

**CONTENT: Grade K Mathematics**

**CORE CONCEPT 8: Algebra and Functions**

**MAJOR OBJECTIVE: Demonstrate an understanding of patterns, relationships, and functions**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<b>PA STANDARD 2.8.3.C</b> Substitute a missing addend in a number sentence.	Teacher will guide student to: Use concrete manipulatives and/or draw pictures to determine the missing addend	Teacher evaluation of:  Student ability to perform task and find missing addend	Textbook resources  Manipulatives  Paper, pencils, crayons, glue  Math journal

**CONTENT: Grade K Mathematics****CORE CONCEPT 8: Algebra and Functions****MAJOR OBJECTIVE: Demonstrate an understanding of patterns, relationships, and functions**

<b>CURRICULUM STANDARD:</b>			
<b>State Standard/Student Expectation</b>	<b>Specific Content</b>	<b>Assessments</b>	<b>Resources/Materials</b>
<b>PA STANDARD 2.8.3.D</b> Create a story to match a given combination of symbols and numbers.	Teacher will guide student to:  Solve a simple story problem and explain the process	Teacher evaluation of:  Student ability to recognize and extend patterns via checklist or rubric	Textbook resources  Manipulatives  Worksheets  Math journal
<b>PA STANDARD 2.8.3.E</b> Use concrete objects and symbols to model the concepts of variables, expressions, equations and inequalities.	Teacher will guide student to:  Use concrete manipulatives and/or pictures to show the process of addition  Use manipulatives to create sets that are equal	Teacher evaluation of:  Student ability to use mathematical symbols correctly  Student ability to name mathematical symbols  Student use of manipulatives to create addition and subtraction number sentences	Textbook resources  Manipulatives  Paper, pencils, crayons, glue  Worksheets  Math journal
<b>PA STANDARD 2.8.3.G</b> Use a table or a chart to display information.	Teacher will guide student to:  Locate the least and greatest values represented.  Identify the types of objects being compared in the graph	Teacher evaluation of:  Student ability to read a table or chart	Textbook resources  Manipulatives  Charts, Tables  Worksheets
<b>PA STANDARD 2.8.3.H</b> Describe and interpret the data shown in tables and charts.	Teacher will guide student to:  Read a chart using pictures to determine the data	Teacher evaluation of:  /Student participation in class discussion and creation of the chart	Textbook resources  Charts, Tables  Math journal

**CONTENT: Grade K Mathematics****CORE CONCEPT 9: Geometry****MAJOR OBJECTIVE: Analyze characteristic and properties of two- and three-dimensional shapes and demonstrate understanding of geometric relationships.**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<b>PA STANDARD 2.9.3.A</b> Name and label geometric shapes in two and three dimensions (e.g., circle/sphere, square/cube, triangle/pyramid, rectangle/prism).	Teacher will guide student to:  Identify two-dimensional shapes including circle, oval, square, rectangle, triangle, diamond and star  Identify three-dimensional shapes including cube, cylinder, prism, and sphere	Teacher evaluation of:  Student recognition of shapes as mentioned using rubric  Student ability to replicate shapes as mentioned using rubric	Textbook resources  Geometric shapes  Worksheets  Stencils  Math journal
<b>PA STANDARD 2.9.3.B</b> Build geometric shapes using concrete objects (e.g., manipulatives).	Teacher will guide student to:  Create various geometric shapes with manipulatives such as pattern blocks, geoboards, and tangrams.	Teacher evaluation of:  Student ability to create shapes with the manipulatives.	Textbook resources  Pattern blocks/Tangrams  Worksheets  Geo Board  Math journal
<b>PA STANDARD 2.9.3.D</b> Find and describe geometric figures in real life.	Teacher will guide student to:  Apply knowledge of two-dimensional shapes to real world identification of shapes within the classroom, school, playground and home	Teacher evaluation of:  Student application of two-dimensional shapes to real-life situations using a rubric	Textbook resources  Geometric shapes  Worksheets  Geo Boards

**CONTENT: Grade K Mathematics****CORE CONCEPT 9: Geometry****MAJOR OBJECTIVE: Analyze characteristic and properties of two- and three-dimensional shapes and demonstrate understanding of geometric relationships.**

<b>CURRICULUM STANDARD:</b>			
<b>State Standard/Student Expectation</b>	<b>Specific Content</b>	<b>Assessments</b>	<b>Resources/Materials</b>
<b>PA STANDARDS 2.9.3.F</b> Identify symmetry in nature.	Teacher will guide student to:  Demonstrate recognition of equal parts  Draw lines of symmetry on variety of two-dimensional shapes	Teacher evaluation of:  Student identification of symmetry and equal parts on written assessment	Textbook resources  Worksheets  Shapes  Math journal
<b>PA STANDARD 2.9.3.C</b> Draw two- and three-dimensional geometric shapes and construct rectangles, squares and triangles on the geoboard and on graph paper satisfying specific criteria.	Teacher will guide student to: Create two-dimensional geometric shapes using concrete objects and geo boards  Draw shapes on dot paper  Draw shapes on graph paper	Teacher evaluation of:  Student representation of two and three- dimensional shapes	Textbook resources  Worksheets  Shapes  Graph paper  Math journal
<b>PA STANDARD 2.9.3.E</b> Identify and draw lines of symmetry in geometric figures.	Teacher will guide student to:  Draw a line of symmetry on a given object	Teacher evaluation of:  Student performance of written task to create the line of symmetry in geometric shapes	Textbook resources  Worksheets  Shapes  Math journal

**CONTENT: Grade K Mathematics**

**CORE CONCEPT 9: Geometry**

**MAJOR OBJECTIVE: Analyze characteristic and properties of two- and three-dimensional shapes and demonstrate understanding of geometric relationships.**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<b>PA STANDARD 2.9.3.G</b> Fold paper to demonstrate the reflections about a line.	Teacher will guide student to:  Explore the concept of reflections.	Teacher evaluation of:  Student responses in class activity	Textbook resources  Worksheets  Math journal  Learning center activities

**CONTENT: Grade K Mathematics**  
**CORE CONCEPT 10: Trigonometry**  
**MAJOR OBJECTIVE: Ability to**

<b>CURRICULUM STANDARD:</b>			
<b>State Standard/Student Expectation</b>	<b>Specific Content</b>	<b>Assessments</b>	<b>Resources/Materials</b>
<b>PA STANDARD 2.10.3.A</b> Identify right angles in the environment.	Teacher will guide student to:  Identify triangles in everyday situations.	Teacher evaluation of:  Student responses in classroom activity and worksheets	Textbook resources  Manipulatives  Worksheets  Math journal
<b>PA STANDARD 2.10.3.B</b> Model right angles and right triangles using concrete objects.	Teacher will guide student to:  Identify and describe similarities and differences in triangles found in everyday situations using pattern blocks, tangrams, etc.	Teacher evaluation of:  Student ability to show right angles using manipulatives	Textbook resources  Manipulatives  Trade books  Worksheets  Math journal

**CONTENT: Grade K Mathematics**

**CORE CONCEPT 11: Concepts of Calculus**

**MAJOR OBJECTIVE: Ability to order numbers from least to most and greatest value**

CURRICULUM STANDARD:			
State Standard/Student Expectation	Specific Content	Assessments	Resources/Materials
<b>PA STANDARD 2.11.3.A</b> Identify whole number quantities and measurements from least to most and greatest value	Teacher will guide student to:  Sequence numbers in proper order  Utilize number cards to place numerals in correct order	Teacher evaluation of:  Student ability to place number cards in order and identify least to greatest	Textbook resources  Number Cards  Math journal
<b>PA STANDARD 2.11.3.D</b> Continue a pattern of numbers or objects that could be extended infinitely	Teacher will guide student to:  Practice patterns with repeating patters: 1,2: 1,2,3:1,2,1,3: etc...  Identify patterns in a sequence of numbers and/or shapes	Teacher evaluation of:  Student ability to identify patterns  Student ability to continue and extend pattern	Textbook resources  Number Cards  Shape and color cards  Math journal

**V. EXPECTED LEVELS OF ACHIEVEMENT**

A. Students are expected to reach the kindergarten level of achievement in mathematics. These skills include developing a complete understanding of one-to-one correspondence, the ability to apply numeration concepts in counting, comparing numbers to 20, adding and subtracting numbers to 10, telling time to the hour, and describing data in charts and graphs.

B. Grading system for all Kindergarten Mathematics classes:

<b>Grading Scale</b>	
+	Consistent Use of Skill
√	Skill Emerging
-	Needs Improvement
NE	Not Evaluated

C. Each student's grade will be determined at the conclusion of the each marking period.