

# Level 1 - 2003 PAAP Mathematics Performance Indicator Rubric

## Math Content Standard A - Numbers and Number Sense

*Students will understand and demonstrate a sense of what numbers mean and how they are used.*

<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio contains evidence that:</p> <p>A1. Using objects, words, or symbols, student can copy a model set with up to 5 members.</p> <p>A2. Student can identify one real-life use of numbers (e.g., prices, recipes, measurement, games, directions in play).</p> <p>A3. Student can do one or more of the following: *using objects, words, or symbols, make a set which matches a given number. *rote count to 10  *make a group of 2 to 5  *given two objects, student can identify which is bigger/smaller</p>	<p>Portfolio contains evidence that:</p> <p>A1. Student can match written or oral numerals to a given set of objects with up to 5 members.</p> <p>A2. Student can identify two real-life uses of numbers (e.g., prices, recipes, measurement, games, directions in play).</p> <p>A3. Student can do three or more of the following: *identify a number to 10 when presented with the numeral  *rote count to 20 *order numbers 1-5  *make and count groups of 10  *given two sets with up to five members, identify which has more/is bigger   *match written or oral numerals to a given set of objects with up to 10 *with or without objects, identify the number of tens in a given number</p>	<p>Portfolio contains evidence that:</p> <p>A1. Student can match numerals to a given set of objects (5 to 10).</p> <p>A2. Student can demonstrate understanding of three real-life uses of numbers (e.g., prices, recipes, measurement, games, directions in play).</p> <p>A3. *Student can do four or more of the following: *identify a number to 100 when presented with the numeral.  *rote count to 100 *order numbers 1-20  *make and count groups of two, five, and ten (up to 100) *given three sets with up to twenty members, identify which has most/the biggest/the smallest   *match written or oral numerals to a given set of objects (more than 10) *with or without objects, student can identify the number of tens in a given number up to 100</p>	<p>Portfolio contains evidence that:</p> <p>A1. Student can match numerals to a given set of objects (10 to 20).</p> <p>A2. Student can demonstrate understanding of more than three uses of numbers (e.g., prices, recipes, measurement, games, directions in play).</p> <p>A3. Student can do all of the following: *identify a number to 1000 when presented with the numeral.  *rote count to 100 *order numbers over 20 up to 1000 *make and count groups of two, five, and ten (between 100 to 1000 and below) *given more than three sets with up to twenty members, identify the biggest and smallest  *match written numerals to a given set of objects (more than 15). *with or without objects, identify the number of tens in a given number up to 1000</p>	<p><b>Students will be able to:</b></p> <p><b>A1. Demonstrate an understanding of what numbers mean (e.g., that the number 7 stands for a group of objects).</b></p> <p><b>A2. Understand the many uses of numbers (e.g., prices, recipes, measurement, directions in play).</b></p> <p><b>A3. Order, compare, read, group, and apply place value concepts to numbers up to 1,000.</b></p>

## Level 1 - 2003 PAAP Mathematics Performance Indicator Rubric (continued)

### Math Content Standard A - Numbers and Number Sense

Students will understand and demonstrate a sense of what numbers mean and how they are used.

1.1	1.2	1.3	1.4	Learning Results Performance Indicators
Portfolio contains evidence that: A4. Given a mathematical statement related to quantities up to five, the student can indicate whether or not the answer is correct (ex., activity demonstrating one-to-one correspondence).	Portfolio contains evidence that: A4. Given real-life math problems involving quantities up to ten and their solutions, the student can correctly determine whether the solutions are reasonable or not (ex. Student responds "yes" or "no" to a question about the reasonableness of a solution).	Portfolio contains evidence that: A4. Given real-life math problems, involving quantities up to 100, with and without their solutions, the student can correctly determine whether the solutions (given or created) are reasonable or not.	Portfolio contains evidence that: A4. Given real-life math problems, involving quantities with or without their solutions, the student can correctly determine whether the solutions (given or created) are reasonable or not.	<b>Students will be able to:</b> <b>A4. Determine reasonableness of results when working with quantities.</b>

## Level 2 - 2003 PAAP Mathematics Performance Indicator Rubric

### Math Content Standard A - Numbers and Number Sense

*Students will understand and demonstrate a sense of what numbers mean and how they are used.*

2.1	2.2	2.3	2.4	Learning Results Performance Indicators
<p>Portfolio contains evidence that:</p> <p>A1. Student can read whole numbers up to ten thousand.</p> <p>A2. Student can read <math>\frac{1}{2}</math> and <math>\frac{1}{4}</math> and demonstrate understanding by representing <math>\frac{1}{2}</math> and <math>\frac{1}{4}</math> with a model.</p> <p>A3. Student can find and identify decimal points in various monetary values.</p>	<p>Portfolio contains evidence that:</p> <p>A1. Student can read and either compare, order, classify or explain whole numbers up to ten thousand.</p> <p>A2. Student can read <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, and <math>\frac{1}{6}</math>, with a model and, in addition, do one of the following: compare, order, classify or explain <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, and <math>\frac{1}{6}</math>.</p> <p>A3. Student can demonstrate one use and/or application of decimals and integers.</p>	<p>Portfolio contains evidence that:</p> <p>A1. Student can read and either compare, order, classify or explain whole numbers up to one million.</p> <p>A2. Student can read <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, and <math>\frac{1}{6}</math> and, in addition, do two of the following: compare, order, classify or explain <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, and <math>\frac{1}{6}</math> fractions.</p> <p>A3. Student can demonstrate two uses and/or applications of decimals and integers.</p>	<p>Portfolio contains evidence that:</p> <p>A1. Student can read, compare, order, classify, and explain whole numbers up to one million.</p> <p>A2. Student can read, compare, order, classify, and explain simple fractions through tenths.</p> <p>A3. Student can demonstrate understanding of the meaning of decimals and integers through multiple uses and/or applications.</p>	<p><b>Students will be able to:</b></p> <p><b>A1. Read, compare, order, classify, and explain whole numbers up to one million.</b></p> <p><b>A2. Read, compare, order, classify, and explain simple fractions through tenths.</b></p> <p><b>A3. Demonstrate knowledge of the meaning of decimals and integers and an understanding of how they may be used.</b></p> <p><b>EXAMPLES</b></p> <p><b>*Using pattern blocks, represent equivalent fractions, such as <math>\frac{1}{3}</math>, <math>\frac{2}{6}</math>, <math>\frac{4}{12}</math>.</b></p> <p><b>*Show how three pizzas can be shared equally by four people.</b></p>

## **Level 1 - 2003 PAAP Mathematics Performance Indicator Rubric**

### **Math Content Standard B - Computation**

*Students will understand and demonstrate computation skills.*

<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>B1. Student can, given two sets of objects with up to five members each, identify the larger/smaller, one with more/less.</p> <p>B2. Student can, using two sets of manipulatives (with two to ten members), count to get the total number of objects.</p> <p>B3. Student can show understanding of addition by using a variety of materials.</p>	<p>Portfolio will provide evidence that:</p> <p>B1. Student can use estimation related to non-standard or standard measurement (volume, temperature <b>or</b> weight, and length).</p> <p>B2. Student can, using manipulatives, apply a strategy to the solving of problems involving addition and subtraction of whole numbers.</p> <p>B3. Student can show understanding of addition and subtraction by using a variety of materials and two strategies.</p>	<p>Portfolio will provide evidence that:</p> <p>B1. Student can use and apply estimation related to non-standard or standard measurement (volume, temperature, weight, and length), quantity <b>and</b> computation <b>or</b> problem-solving.</p> <p>B2. Student can, with or without manipulatives, apply two strategies to the solving of problems involving addition and subtraction of whole numbers.</p> <p>B3. Student can show understanding of addition and subtraction by using a variety of materials, strategies, and numerical symbols up to twenty.</p>	<p>Portfolio will provide evidence that:</p> <p>B1. Student can use and apply estimation with quantities, measurements, computations, and problem-solving.</p> <p>B2. Student can, with or without manipulatives, apply multiple strategies to the solving of problems involving addition and subtraction of whole numbers.</p> <p>B3. Student can show understanding of addition and subtraction by using a variety of materials, strategies, and numerical symbols.</p>	<p><b>Students will be able to:</b></p> <p><b>B1. Use and apply estimation with quantities, measurements, computations, and problem-solving.</b></p> <p><b>B2. Use multiple strategies in solving problems involving addition and subtraction of whole numbers.</b></p> <p><b>B3. Show understanding of addition and subtraction by using a variety of materials, strategies, and symbols.</b></p>

*\*Non-standard units might be hands, foot size, string, etc.*

## Level 2 - 2003 PAAP Mathematics Performance Indicator Rubric

### Math Content Standard B - Computation

*Students will understand and demonstrate computation skills.*

2.1	2.2	2.3	2.4	Learning Results Performance Indicators
<p>Portfolio will provide evidence that:</p> <p>B1. Student can solve single step, real-life problems using addition and subtraction with whole numbers.</p> <p>B2. Student can solve real-life problems involving addition of simple fractions with common denominators (<math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{6}</math>), using concrete models (ex., pattern blocks).</p> <p>B3. Student can, given a problem, identify an appropriate tool or technology to solve it.</p> <p>B4. Student demonstrates proficiency with addition and subtraction facts and addition algorithms when working with two 2 digit whole numbers, by using a variety of materials, strategies, and technologies.</p>	<p>Portfolio will provide evidence that:</p> <p>B1. Student can solve two step, real-life problems using addition and subtraction with whole numbers.</p> <p>B2. Student can solve real-life problems involving addition of simple fractions with common denominators (<math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{6}</math>, <math>\frac{1}{8}</math>, <math>\frac{1}{10}</math>), using concrete models (ex., pattern blocks, geoboards).</p> <p>B3. Student can, given a problem, use an appropriate tool or technology to solve it.</p> <p>B4. Student demonstrates proficiency with the addition and subtraction facts and addition and subtraction algorithms, when working with up to two, 2 digit whole numbers, by using mental math and a variety of materials, strategies, and technologies.</p>	<p>Portfolio will provide evidence that:</p> <p>B1. Student can solve multi-step, real-life problems using addition and subtraction with whole numbers and single step, real-life problems using multiplication of whole numbers.</p> <p>B2. Student can solve real-life problems involving addition and/or subtraction of simple fractions with common denominators (<math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{6}</math>, <math>\frac{1}{8}</math>, <math>\frac{1}{10}</math>) using concrete models (ex. pattern blocks, geoboards).</p> <p>B3. Student can, given a problem, use appropriate tools and technology to solve it and describe/demonstrate the problem-solving process applied.</p> <p>B4. Student demonstrates proficiency with the addition, subtraction, multiplication, and division facts and addition, subtraction, and multiplication algorithms, when working with whole numbers with two or more digits, using mental math and a variety of materials, strategies, and technologies.</p>	<p>Portfolio will provide evidence that:</p> <p>B1. Student can solve multi-step, real-life problems using all four operations with whole numbers.</p> <p>B2. Student can solve real-life problems involving addition and subtraction of simple fractions with common denominators (<math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{6}</math>, <math>\frac{1}{8}</math>, <math>\frac{1}{10}</math>).</p> <p>B3. Student can, given a problem, use appropriate tools and technology to solve it, describe/demonstrate the process applied, and defend the reasonableness of results.</p> <p>B4. Student demonstrates proficiency with the facts and algorithms of the four operations when working with whole numbers, using mental math and a variety of materials, strategies, and technologies.</p>	<p><b>Students will be able to:</b></p> <p><b>B1. Solve multi-step, real-life problems using the four operations with whole numbers.</b></p> <p><b>B2. Solve real-life problems involving addition and subtraction of simple fractions.</b></p> <p><b>B3. Demonstrate and explain the problem-solving process using appropriate tools and technology and defend the reasonableness of results.</b></p> <p><b>B4. Develop proficiency with the facts and algorithms of the four operations on whole numbers using mental math and a variety of materials, strategies, and technologies.</b></p>

## Level 1 - 2003 PAAP Mathematics Performance Indicator Rubric

Content Standard C - Data Analysis and Statistics

*Students will understand and apply concepts of data analysis.*

<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>C1. Student can collect data with given arrangement.</p> <p>C2. Student can tally information provided.</p>	<p>Portfolio will provide evidence that:</p> <p>C1. Student can collect and arrange data.</p> <p>C2. Student can tally information gathered from immediate surroundings.</p>	<p>Portfolio will provide evidence that:</p> <p>C1. Student can solve problems by collecting, arranging, and interpreting data.</p> <p>C2. Student can tally and graph information provided.</p>	<p>Portfolio will provide evidence that:</p> <p>C1. Student can formulate and solve problems by collecting, arranging, and interpreting data.</p> <p>C2. Student can tally and graph information gathered from immediate surroundings.</p>	<p><b>Students will be able to:</b></p> <p><b>C1. Formulate and solve problems by collecting, arranging, and interpreting data.</b></p> <p><b>C2. Make tallies and graphs of information gathered from immediate surroundings.</b></p>

## Level 2 - 2003 PAAP Mathematics Performance Indicator Rubric

Content Standard C - Data Analysis and Statistics

*Students will understand and apply concepts of data analysis.*

<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>C1. Student can make generalizations and draw conclusions using one type of graph, chart, <u>or</u> table.</p> <p>C2. Student can read one type of data display.</p>	<p>Portfolio will provide evidence that:</p> <p>C1. Student can make generalizations and draw conclusions using two of the three following options: graph, chart, table.</p> <p>C2. Student can read two different kinds of data display.</p>	<p>Portfolio will provide evidence that:</p> <p>C1. Student can make generalizations and draw conclusions using one type of graph, one type of chart, and one type of table.</p> <p>C2. Student can read three or more different types of displays of data and interpret one type of data.</p>	<p>Portfolio will provide evidence that:</p> <p>C1. Student can make generalizations and draw conclusions using various types of graphs, charts, and tables.</p> <p>C2. Student can read and interpret displays of data.</p>	<p><b>Students will be able to:</b></p> <p><b>C1. Make generalizations and draw conclusions using various types of graphs, charts, and tables.</b></p> <p><b>C2. Read and interpret displays of data.</b></p>

# **Level 1 - 2003 PAAP Mathematics Performance Indicator Rubric**

## **Content Standard D - Probability**

*Students will understand and apply concepts of probability.*

<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>Learning Results Performance Indicators</b>
Portfolio will provide evidence that: D1. Student can record the outcome of a simple event (trial).	Portfolio will provide evidence that: D1. Given an event (trial)with two possible outcomes, student can choose the more likely or less likely to occur.	Portfolio will provide evidence that: D1. Student can record outcomes of simple events (trials), and identify the most likely outcome based on the data recorded.	Portfolio will provide evidence that: D1. Student can apply concepts of chance (ex., predictions of outcomes) and check them by recording outcomes of simple events.	<b>Students will be able to:</b> <b>D1. Use concepts of chance and record outcomes of simple events.</b> <b>EXAMPLE</b> <b>*Investigate the possible and likely outcomes when rolling a number cube.</b>

## Level 2 - 2003 PAAP Mathematics Performance Indicator Rubric

### Content Standard D - Probability

*Students will understand and apply concepts of probability.*

<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>D1. Given an event with two possible outcomes, student can explain/demonstrate outcomes more likely or less likely to occur.</p> <p>D2. After completing up to ten trials that are recorded, the student will identify how many times each outcome occurred.</p>	<p>Portfolio will provide evidence that:</p> <p>D1. Given an event with three possible outcomes, student can explain/demonstrate outcomes more likely and less likely to occur.</p> <p>D2. After completing up to ten trials that are recorded, the student will estimate the least or most likely of the outcomes, based on the data.</p>	<p>Portfolio will provide evidence that:</p> <p>D1. Student can explain/demonstrate the concept of chance in predicting the outcomes of simple events.</p> <p>D2. Student can estimate probability as a fraction from a sample of observed outcomes <u>or</u> simulations with up to ten trials.</p>	<p>Portfolio will provide evidence that:</p> <p>D1. Student can explain/demonstrate the concept of chance in predicting outcomes.</p> <p>D2. Student can estimate probability as a fraction from a sample of observed outcomes <u>and</u> simulations with up to ten trials.</p>	<p><b>Students will be able to:</b></p> <p><b>D1. Explain the concept of chance in predicting outcomes.</b></p> <p><b>D2. Estimate probability from a sample of observed outcomes and simulations.</b>  <b>EXAMPLE</b>  <b>*Investigate the possible and likely outcomes when rolling a number cube.</b></p>

## Level 1 - 2003 PAAP Mathematics Performance Indicator Rubric

Content Standard E - Geometry

*Students will understand and apply concepts from geometry.*

<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>E1. Student can identify one or more 2D shapes.</p> <p>E2. Given a choice of two 2D shapes, student can select the one that will cover a given 2D shape.</p> <p>E3. Given one positional word describing the relationship between two objects (e.g., over, under, beside, to the left) student can model/demonstrate the relationship.</p>	<p>Portfolio will provide evidence that:</p> <p>E1. Student can identify and model two or more 2D shapes.</p> <p>E2. Student can combine two or more 2D shapes to cover a 2D shape.</p> <p>E3. Given positional word(s) describing the relationship among three or more objects (e.g., over, under, beside, to the left) student can model the relationship.</p>	<p>Portfolio will provide evidence that:</p> <p>E1. Student can identify, model and classify four or more 2D shapes.</p> <p>E2. Student can demonstrate and predict the results of combining and dividing, <b>or</b> changing 2D shapes.</p> <p>E3. Given positional word(s) describing the relationship among three or more objects (e.g., over, under, beside, to the left) student can model and describe the relationship.</p>	<p>Portfolio will provide evidence that:</p> <p>E1. Student can describe, model, and classify 2D shapes and selected 3D figures.</p> <p>E2. Student can investigate and predict the results of combining, dividing, <b>and</b> changing 2D shapes.</p> <p>E3. Student can use positional words to describe the relationship (e.g., over, under, beside, to the left) of two or more objects.</p>	<p><b>Students will be able to:</b></p> <p><b>E1. Describe, model, and classify 2D shapes and selected 3D figures.</b></p> <p><b>E2. Investigate and predict the results of combining, dividing, and changing 2D shapes.</b></p> <p><b>E3. Use positional words to describe the relationship of two or more objects (e.g., over, under, beside, to the left).</b></p>

## Level 2 - 2003 PAAP Mathematics Performance Indicator Rubric

Content Standard E - Geometry

*Students will understand and apply concepts from geometry.*

<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>E1. Student can classify 2D shapes and 3D figures using applicable properties.</p> <p>E2. Through experimentation, student can match congruent shapes among a set of four shapes.</p> <p>E3. Student can identify transformations such as slides <u>or</u> flips.</p> <p>E4. Student can identify three different shapes and figures in the physical world.</p>	<p>Portfolio will provide evidence that:</p> <p>E1. Student can classify and model 2D shapes and 3D figures using applicable properties.</p> <p>E2. Through experimentation student can identify congruent shapes and lines of symmetry.</p> <p>E3. Student can use transformations such as slides <u>and</u> flips.</p> <p>E4. Student can identify five different shapes and figures in the physical world.</p>	<p>Portfolio will provide evidence that:</p> <p>E1. Student can describe, model, and classify 2D shapes and figures; and, classify and model 3D figures, using applicable properties.</p> <p>E2. Through experimentation, student can identify and model congruent shapes and lines of symmetry.</p> <p>E3. Student can use transformations such as slides, flips, and rotations with three shapes.</p> <p>E4. Student can use the properties of shapes and figures to describe three or more aspects of the physical world.</p>	<p>Portfolio will provide evidence that:</p> <p>E1. Student can describe, model, and classify 2D and 3D shapes and figures using applicable properties.</p> <p>E2. Through experimentation with shapes and figures, student can make generalizations regarding congruency, symmetry, and similarity.</p> <p>E3. Student can use transformations such as slides, flips, and rotations with four or more shapes.</p> <p>E4. Student can use the properties of shapes and figures to describe five or more aspects of the physical world.</p>	<p><b>Students will be able to:</b></p> <p><b>E1. Describe, model, and classify shapes and figures using applicable properties.</b></p> <p><b>E2. Experiment with shapes and figures to make generalizations regarding congruency, symmetry, and similarity.</b></p> <p><b>E3. Use transformations such as slides, flips, and rotations.</b></p> <p><b>E4. Use the properties of shapes and figures to describe the physical world.</b></p>

## Level 1 - 2003 PAAP Mathematics Performance Indicator Rubric

Content Standard F - Measurement

*Students will understand and demonstrate measurement skills.*

<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>F1. Student can compare two items or events based on length, temperature, <b>or</b> weight, by identifying which is longer/shorter, hotter/colder, or heavier/lighter.</p> <p>F2. Student can match coins (penny, nickel, dime, <b>or</b> quarter) to the coin's picture or a coin of the same value.</p> <p>F3. Student can identify appropriate standard tools for determining length, weight, <b>or</b> capacity.</p>	<p>Portfolio will provide evidence that:</p> <p>F1. Student can measure (using non-standard of standard units) length <b>and</b> weight.</p> <p>F2. Student can match coins (penny, nickel, dime, <b>and</b> quarter) to the coin's name, given orally or in writing.</p> <p>F3. Student can select and use appropriate standard and/or nonstandard tools for determining length, weight, <b>and</b> capacity.</p>	<p>Portfolio will provide evidence that:</p> <p>F1. Student can estimate and measure length <b>and</b> weight, and measure time, temperature, and capacity.</p> <p>F2. Student can identify the penny, nickel, dime and quarter, and give the value of two of them.</p> <p>F3. Student can select and use appropriate standard and nonstandard tools for determining length, temperature, weight, time, <b>and</b> capacity.</p>	<p>Portfolio will provide evidence that:</p> <p>F1. Student can estimate and measure length, temperature, weight, time, and capacity.</p> <p>F2. Student can identify and give the value of the penny, nickel, dime, and quarter.</p> <p>F3. Student can select appropriate standard and nonstandard tools for determining length, temperature, weight, time, and capacity, and use them to solve every day problems.</p>	<p><b>Students will be able to:</b></p> <p><b>F1. Estimate and measure length, time, temperature, weight, and capacity.</b></p> <p><b>F2. Identify and give the value of different coins.</b></p> <p><b>F3. Select standard and non-standard tools for determining length, time, temperature, weight, and capacity, and use them to solve every day problems.</b></p>

*\*Non-standard units might be hands, foot size, string, etc.*

## Level 2 - 2003 PAAP Mathematics Performance Indicator Rubric

Content Standard F - Measurement

*Students will understand and demonstrate measurement skills.*

<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>F1. Student can solve real-life problems involving the measurement of length and weight.</p> <p>F2. Student can select measuring tools that are appropriate for measuring time, length, weight, temperature, and capacity.</p>	<p>Portfolio will provide evidence that:</p> <p>F1. Student can solve real-life problems involving the measurement of time, length, weight, and temperature.</p> <p>F2. Student can select measuring tools that are appropriate for measuring time, length, weight, temperature, area, perimeter, mass, capacity, and volume.</p>	<p>Portfolio will provide evidence that:</p> <p>F1. Student can solve real-life problems involving the measurement of time, length, weight, temperature, area, perimeter, mass, capacity, and volume.</p> <p>F2. Student can select measuring tools and units of measurement that are appropriate for measuring time, length, weight, temperature, and capacity.</p>	<p>Portfolio will provide evidence that:</p> <p>F1. Student can solve and justify solutions to real-life problems involving the measurement of time, length, weight, temperature, area, perimeter, mass, capacity, and volume.</p> <p>F2. Student can select measuring tools and units of measurement that are appropriate for measuring time, length, weight, temperature, area, perimeter, mass, capacity, and volume.</p>	<p><b>Students will be able to:</b></p> <p><b>F1. Solve and justify solutions to real-life problems involving the measurement of time, length, area, perimeter, weight, temperature, mass, capacity, and volume.</b></p> <p><b>F2. Select measuring tools and units of measurement that are appropriate for what is being measured.</b></p>

## Level 1 - 2003 PAAP Mathematics Performance Indicator Rubric

Content Standard G - Patterns, Relations, Functions

*Students will understand that mathematics is the science of patterns, relationships, and functions.*

<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>G1. Student can copy a pattern, using concrete materials.</p> <p>G2. Student can explore relationships by correctly identifying two given sets as being equal or unequal.</p> <p>G3. Given two similar shapes <u>or</u> two numbers, student can identify the one that is bigger/smaller.</p>	<p>Portfolio will provide evidence that:</p> <p>G1. Student can recognize, copy, and extend a pattern.</p> <p>G2. Student can explore relationships by selecting the group that is greater than, less than, or equal to, from three or more groups.</p> <p>G3. Given two similar shapes <u>and</u> two numbers, student can identify the one that is bigger/smaller.</p>	<p>Portfolio will provide evidence that:</p> <p>G1. Student can recognize, copy, describe, and extend a wide variety of patterns.</p> <p>G2. Student can explore the use of open sentences to describe relationships (ex., <math>&gt;</math>, <math>&lt;</math>, <math>=</math>).</p> <p>G3. Student can represent/model and describe geometric <u>or</u> numeric relationships.</p>	<p>Portfolio will provide evidence that:</p> <p>G1. Student can recognize, copy, describe, extend, and create a wide variety of patterns.</p> <p>G2. Student can explore the use of variables and open sentences to describe relationships (ex., <math>&gt;</math>, <math>&lt;</math>, <math>=</math>).</p> <p>G3. Student can represent/model <u>and</u> describe both geometric and numeric relationships.</p>	<p><b>Students will be able to:</b></p> <p><b>G1. Recognize, describe, extend, copy, and create a wide variety of patterns.</b></p> <p><b>G2. Explore the use of variables and open sentences to describe relationships.</b></p> <p><b>G3. Represent and describe both geometric and numeric relationships.</b></p>

## Level 2 - 2003 PAAP Mathematics Performance Indicator Rubric

Content Standard G - Patterns, Relationships, Functions

*Students will understand that mathematics is the science of patterns, relationships, and functions.*

<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>G1. Student can copy patterns of numbers, geometry, and a variety of graphs.</p> <p>G2. Student can correctly complete open sentences.</p>	<p>Portfolio will provide evidence that:</p> <p>G1. Student can extend patterns of numbers, geometry, and a variety of graphs.</p> <p>G2. From four or more choices, student can select the one that matches a given situation.</p>	<p>Portfolio will provide evidence that:</p> <p>G1. Student can create patterns of numbers, geometry, and a variety of graphs.</p> <p>G2. Student can use open sentences to express relationships.</p>	<p>Portfolio will provide evidence that:</p> <p>G1. Student can use patterns of numbers, geometry, and a variety of graphs to solve problems.</p> <p>G2. Student can use variables and open sentences to express relationships.</p>	<p style="text-align: center;"><b>Students will be able to:</b></p> <p><b>G1. Use the patterns of numbers, geometry, and a variety of graphs to solve a problem.</b></p> <p><b>G2. Use variables and open sentences to express relationships.</b></p>

## Level 1 - 2003 PAAP Mathematics Performance Indicator Rubric

Content Standard H - Algebra Concepts  
*Students will understand and apply algebraic concepts.*

<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>H1. Student can select from two choices, the model/picture that accurately represents the answer to a problem situation or mathematical expression (ex., choose picture representing the number of people in your family from two given choices).</p> <p>H2. Given a choice of two mathematical expressions (ex., <i>add</i> - combine two sets of objects; <i>bigger</i> - identify bigger item of two given), student can select the one that correctly describes the relationship.</p>	<p>Portfolio will provide evidence that:</p> <p>H1. Student can draw, act out, or otherwise model two problem situations in which there is an unknown, incorporating a choice of tools or approaches.</p> <p>H2. Student can use concrete materials to express numerical and other relationships.                      EXAMPLE                      *Using unifix cubes to show how <math>2 + 4</math> and <math>4 + 2</math> will equal 6.</p>	<p>Portfolio will provide evidence that:</p> <p>H1. Student can draw, act out, or otherwise model more than two types of problem situations using a variety of tools and approaches.</p> <p>H2. Student can use concrete materials to express numerical relationships and use numeric symbols to represent sums and differences.</p>	<p>Portfolio will provide evidence that:</p> <p>H1. Student can draw, act out, or otherwise model problem situations and mathematical expressions, using a variety of tools and approaches.</p> <p>H2. Student can use language and numeric symbols to express numerical and other relationships.                      EXAMPLE                      *Show all the ways to make 10 (e.g., <math>2 + x = 10</math>, and so forth) by using blocks or other objects to demonstrate mathematical statements.</p>	<p><b>Students will be able to:</b></p> <p><b>H1. Make drawings for problem situations and mathematical expressions in which there is an unknown, using a variety of tools and approaches.</b></p> <p><b>H2. Use language and symbols to express numerical and other relationships.</b></p>

## Level 2 - 2003 PAAP Mathematics Performance Indicator Rubric

Content Standard H - Algebra Concepts  
*Students will understand and apply algebraic concepts.*

<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.4</b>	Learning Results Performance Indicators
Portfolio will provide evidence that: H1. Student can supply missing elements in simple equations. EXAMPLE $4 + 6 = \underline{\quad}$  H2. Student can solve for a missing addend for sums up to 10 in an equation with a variable. EXAMPLE $3 + x = 10$	Portfolio will provide evidence that: H1. Student can use (evaluate) simple formulas in problem-solving contexts.  H2. Student can solve for a missing addend for sums up to 100 in an equation with a variable. EXAMPLE $3 + x = 10$	Portfolio will provide evidence that: H1. Student can choose and use (evaluate) simple formulas in problem solving contexts.  H2. Student can find appropriate replacements for variables that make number sentences related to addition or subtraction true.	Portfolio will provide evidence that: H1. Student can develop, and use (evaluate) simple formulas in problem-solving contexts.  H2. Student can find appropriate replacements for variables that make number sentences related to any of the four operations true.	<b>Students will be able to:</b>  <b>H1. Develop and evaluate simple formulas in problem-solving contexts.</b>  <b>H2. Find replacements for variables that make simple number sentences true.</b>

## Level 1 - 2003 PAAP Mathematics Performance Indicator Rubric

### Content Standard I - Discrete Mathematics

*Students will understand and apply concepts in discrete mathematics.*

<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>I1. Student can sort objects in a set with five or fewer members into two groups, using one given attribute.</p> <p>I2. Given a choice of two elements, student can choose one that would be an element in an organized list for a given category.</p>	<p>Portfolio will provide evidence that:</p> <p>I1. Student can sort sets of objects with more than five members into two groups, using one attribute.</p> <p>I2. Student can identify elements of things to be in an organized list.</p>	<p>Portfolio will provide evidence that:</p> <p>I1. Student can classify the same sets of objects into two or more groups, in two different ways, using different attributes.</p> <p>I2. Student can describe how a given organized list (with six or fewer elements) was made.</p>	<p>Portfolio will provide evidence that:</p> <p>I1. Student can classify sets of objects into two or more groups, using two attributes (ex., squares, red things, and red squares).</p> <p>I2. Student can create and use an organized list to determine possible outcomes or solve problems.</p>	<p><b>Students will be able to:</b></p> <p><b>I1. Classify sets of objects into two or more groups using their attributes.</b>  <b>EXAMPLE</b>  <b>*Sort sets of tiles by color, size, and shape</b></p> <p><b>I2. Create and use an organized list to determine possible outcomes or solve problems.</b>  <b>EXAMPLE</b>  <b>*Determine the possible arrangements for a triple ice cream cone given three flavors of ice cream.</b></p>

## Level 2 - 2003 PAAP Mathematics Performance Indicator Rubric

Content Standard I - Discrete Mathematics

*Students will understand and apply concepts in discrete mathematics.*

<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.4</b>	<b>Learning Results Performance Indicators</b>
<p>Portfolio will provide evidence that:</p> <p>I1. Student can use one of the following: organized lists, tree diagrams, Venn diagrams, networks.</p> <p>I2. Student can describe/demonstrate what a mathematical solution is.</p>	<p>Portfolio will provide evidence that:</p> <p>I1. Student can use two of the following: organized lists, tree diagrams, Venn diagrams, and networks.</p> <p>I2. Student can define <b>or</b> explain infinite and finite.</p>	<p>Portfolio will provide evidence that:</p> <p>I1. Student can create and use organized lists, tree diagrams, and Venn diagrams.</p> <p>I2. Student can identify given solutions as finite or infinite.</p>	<p>Portfolio will provide evidence that:</p> <p>I1. Student can create and use organized lists, tree diagrams, Venn diagrams, and networks.</p> <p>I2. Student can give examples of infinite and finite solutions.</p>	<p><b>Students will be able to:</b></p> <p><b>I1. Create and use organized lists, tree diagrams, Venn diagrams, and networks.</b>  <b>EXAMPLE</b>  <b>*Use a Venn diagram to record the correlation between students who wore a sweater to school and students who walked to school.</b></p> <p><b>I2. Give examples of infinite and finite solutions.</b></p>