

Math in Pre-Primary

In Pre-Primary, the alignment between AERO standards and the Montessori approach cultivates a robust mathematical understanding in young learners. AERO standards encourage students to grasp fundamental numerical concepts such as counting to 100, recognizing numbers, and understanding basic addition and subtraction within 10. At the same time, Montessori's methodology emphasizes incremental learning, enabling our students to progress from simple to complex mathematical concepts through tactile experiences with manipulative materials.

AERO Standards	That means students will...
K.CC.1 Count to 100 by ones and by tens.	Count to 100 by ones and tens.
K.CC.2 Count forward beginning from a given number within the known sequence (instead of having to begin at 1).	Count forward starting at a given number.
K.CC.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).	Write numbers from 0 to 20. Write a number for a group of 0 to 20 objects.
K.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality. a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. c. Understand that each successive number name refers to a quantity that is one larger.	Put numbers in order.
K.CC.5 Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.	Count out a number of objects between 1 and 20.
K.CC.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.	Tell if a group of objects in one group is greater than, less than or equal to a group of objects in another group.
K.OA.1 Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.	Use objects, fingers and pictures to help show addition and subtraction.
K.NBT.1 Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., $18 = 10 + 8$); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	Use objects, drawings or equations to show tens and ones.
K.MD.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.	Compare how two objects are similar or different. (more of, less of, taller, shorter)
K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.	Place objects into categories.

Math in Grade 1

In Grade 1, students are understanding and representing numbers up to 100, mastering basic addition and subtraction within 20, exploring shapes and their attributes, recognizing and creating simple patterns, and developing an understanding of measurement and data representation. Additionally, Grade 1 students are expected to engage in collaborative problem-solving activities that encourage critical thinking and application of conceptual understanding in real-world contexts, fostering a solid mathematical foundation for future learning.

AERO Standards	That means students will ...
1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	Use strategies to solve addition and subtraction word problems.
1.OA.2 Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	Solve word problems by adding 3 whole numbers.
1.NBT.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.	Count to 120.
1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: a. 10 can be thought of as a bundle of ten ones — called a “ten.” b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).	Tell how many tens and how many ones are in a number.
1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.	Compare two-digit numbers using $<$, $=$, and $>$.
1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.	Find 10 more or 10 less in their head.
1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.	Put three objects in order from longest to shortest.
1.MD.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.	Tell the length of an object using whole numbers.
1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks.	Tell and write time in hours and half-hours using a clock.
1.MD.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.	Organize, understand and answer questions about data.
1.G.1 Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.	Tell about, build, and draw shapes.

Math in Grade 2

Students in Grade 2 expand on their prior knowledge and experiences from grade 1 to include further exploration of number sense and operations. There is an emphasis on addition and subtraction strategies within 100, introduction to multiplication and division concepts, and developing fluency in solving word problems. Additionally, Grade 2 students are expected to expand their knowledge of shapes and measurement, explore concepts of time and money, and begin to interpret simple graphs. Through engaging activities and problem-solving tasks, Grade 2 mathematics aims to foster critical thinking skills and lay a strong foundation for future mathematical learning.

AERO Standards	That means students will ...
2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	Use strategies to solve addition and subtraction word problems.
2.OA.2 Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.	Quickly recall their addition and subtraction facts.
2.OA.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.	Group objects to tell if a number is odd or even.
2.OA.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.	Use repeated addition to help understand multiplication.
2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.	Count to 1,000 using 1s, 5s, 10s and 100s.
2.NBT.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.	Compare three-digit numbers using $<$, $=$, and $>$.
2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	Add and subtract three-digit numbers.
2.NBT.8 Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.	Add and subtract tens and hundreds in their head.
2.MD.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.	Tell time to five minutes and understand a.m. and p.m.
2.G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.	Name and draw shapes.
2.G.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	Use repeated addition to find the area of a rectangle.

Math in Grade 3

Grade 3 focuses on mastery of multiplication and division facts, fluency in addition and subtraction within 1,000, and proficiency in solving multi-step word problems involving all four operations. Grade 3 students also explore concepts related to fractions, including understanding fractions as parts of a whole and comparing fractions with like and unlike denominators. Additionally, students delve into measurement and data interpretation, learning to measure and estimate lengths, liquid volumes, and masses and organize and represent data using charts and graphs. Through hands-on activities and real-world problem-solving tasks, Grade 3 mathematics aims to develop students' critical thinking and reasoning abilities while preparing them for further mathematical exploration in higher grades.

AERO Standards	That means students will ...
3.OA.1 Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .	Understand multiplication by thinking about groups of objects.
3.OA.2 Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.	Understand division by considering how one group can be divided into smaller groups.
3.OA.3 Use multiplication and division within 100 to solve word problems involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	Use what they know about multiplication and division to solve word problems.
3.OA.5 Apply properties of operations as strategies to multiply and divide.2 Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)	Use the properties of multiplication to solve equations.
3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.	Use addition, subtraction, multiplication, and division to solve all kinds of word problems, and then use mental math to decide if the answers are reasonable.
3.NBT.1 Use place value understanding to round whole numbers to the nearest 10 or 100.	Round numbers to the nearest ten or 100.
3.NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	Add and subtract numbers within 1000.
3.NF.1 Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by parts of size $1/b$.	Show and understand that fractions are equal parts of a whole.
3.MD.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	Tell and write time to the nearest minute.
3.MD.8 Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	Solve real-world math problems using what they know about the perimeter of shapes.

Math in Grade 4

Grade 4 continues to focus on mastery of multiplication and division, including multi-digit multiplication and long division, as well as proficiency in adding and subtracting fractions and decimals. Grade 4 students also explore geometric concepts such as angles, lines, and symmetry, and they further develop their understanding of measurement, including area, perimeter, and volume. Additionally, students learn to analyze and interpret data through various representations such as tables, graphs, and charts, and they engage in problem-solving activities that require critical thinking and mathematical reasoning.

AERO Standards	That means students will ...
4.OA.1 Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	Understand that multiplication fact problems can be seen as comparisons of groups.
4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	Multiply or divide to solve word problems by using drawings or writing equations and solving for a missing number.
4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	Use what they know about addition, subtraction, multiplication and division to solve multi-step word problems involving whole numbers.
4.NBT.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.	Read, write and compare larger whole numbers using numerals, words and in expanded form.
4.NBT.3 Use place value understanding to round multi-digit whole numbers to any place.	Round large whole numbers to any place.
4.NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.	Add and subtract large numbers.
4.NBT.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	Multiply a whole number up to four digits by a one-digit whole number.
4.NBT.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	Multiply two two-digit numbers.
4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.	Use what she knows about area and perimeter to solve real world problems involving rectangles.
4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two- dimensional figures.	Identify and draw points, lines, line segments, rays, angles and perpendicular & parallel lines.

Math in Grade 5

Grade 5 focuses on mastery of operations with fractions and decimals, including addition, subtraction, multiplication, and division. Grade 5 students also delve into more advanced topics such as operations with mixed numbers, and they begin to explore concepts of algebraic thinking, including understanding variables and expressions. Additionally, students deepen their understanding of geometry, including the classification of two-dimensional shapes and the calculation of volume and surface area for three-dimensional shapes. Furthermore, Grade 5 mathematics often involves engaging with data analysis, including interpreting and creating various types of graphs and charts, as well as solving problems involving measurement and conversions.

AERO Standards	That means students will ...
5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.	Understand and explain the value of digits.
5.NBT.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	Explain patterns when multiplying a number by powers of 10 and when a decimal is multiplied or divided by a power of 10.
5.NBT.3 Read, write, and compare decimals to thousandths.	Read, write, and compare decimals to thousandths.
5.NBT.4 Use place value understanding to round decimals to any place.	Use place value understanding to round decimals to any place.
5.NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm.	Multiply multi-digit whole numbers.
5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	Illustrate and explain a division problem using equations, arrays and/or models.
5.NF.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.	Solve real world problems by multiplying fractions and mixed numbers.
5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.	Understand volume.
5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.	Solve real world problems involving volume.
5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.	Classify shapes into categories.