

MAFS At-A-Glance Overview For Parents#

| Grade | MAFS Grade Level Overview | Support MAFS Learning At Home |
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| K | <p>In kindergarten, your child will focus primarily on two important areas. The first is learning numbers and what numbers represent. The second is addition and subtraction. Students will also learn to identify and work with shapes. Activities in these areas include:</p> <ul style="list-style-type: none"> Counting how many objects are in a group and comparing the quantities of two groups of objects Comparing two numbers to identify which is greater or less than the other Understanding addition as putting together and subtraction as taking away from Adding and subtracting very small numbers quickly and accurately Breaking up numbers less than or equal to 10 in more than one way (for example, $9=6+3$, $9=5+4$) For any number from 1 to 9, finding the missing quantity that is needed to reach 10 Representing addition and subtraction word problems using objects or by drawing pictures Solving addition and subtraction word problems involving numbers that add up to 10 or less or by subtracting from a number 10 or less Measuring the lengths of objects using a shorter object as a unit of length | <ul style="list-style-type: none"> Use everyday objects to allow your child to count and group a collection of objects. Encourage your child to construct numbers in multiple ways. For example, what are some ways that you can make 10? Answers might include $5+5$, $6+4$, $8+2$, etc. Have your child explain his or her thinking. Have your child create story problems to represent addition and subtraction of small numbers. For example, "Ann had eight balloons. Then she gave three away, so she only had five left." Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math. Praise your child when he or she makes an effort and share in the excitement when he or she |
| 1 | <p>In grade one, students will work with whole numbers and place value—including grouping numbers into tens and ones as they learn to add and subtract up through 20. Students will also use charts, tables, and diagrams to solve problems. Activities in these areas will include:</p> <ul style="list-style-type: none"> Quickly and accurately adding numbers together that total up to 10 or less and subtracting from numbers up through 10 Understanding the rules of addition and subtraction (for example, $5+2=2+5$) Solving word problems that involve adding or subtracting numbers up through 20 Understanding what the different digits mean in two-digit numbers (place value) Comparing two-digit numbers using the symbols $>$ (more than), $=$ (equal to), and $<$ (less than) Understanding the meaning of the equal sign ($=$) and determining if statements involving addition and subtraction are true or false (for example, which of the following statements are true? $3+3=6$, $4+1=5+2$) Adding one- and two-digit numbers together Understand how to use a ruler to measure length to the nearest inch. Putting objects in order from longest to shortest or shortest to longest Identify and combine values of money in cents up to one dollar working with a single unit of currency Organizing objects into categories and comparing the number of objects in different categories Dividing circles and rectangles into halves and quarters | <ul style="list-style-type: none"> Look for everyday opportunities to have your child do mathematics. For example, if you open a carton of eggs and take out seven, ask, "How many are left in the carton?" Play math games with your child. For example, "I'm thinking of a number. When I add five to it, I get 11. What is the number?" Encourage your child to read and write numbers in different ways. For example, what are some ways that you can make the number 15? 15 can be $10+5$, $7+8$, $20-5$, or $5+5+5$. Have your child create story problems to represent addition, subtraction, and comparisons. For example, "I have seven pennies. My brother has five pennies. How many pennies does he need to have the same number as I have? He needs two more pennies." Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math. Praise your child when he or she makes an effort and share in the excitement when he or she solves a problem or understands something for the first time. |
| 2 | <p>In grade two, students will extend their understanding of place value to the hundreds place. They will use this place value understanding to solve word problems, including those involving length and other units of measure. Students will continue to work on their addition and subtraction skills, quickly and accurately adding and subtracting numbers up through 20 and also working with numbers up through 100. They will also build a foundation for understanding fractions by working with shapes and geometry. Activities in these areas will include:</p> <ul style="list-style-type: none"> Quickly and accurately adding numbers together that total up to 20 or less or subtracting from numbers up through 20 Solving one- or two-step word problems by adding or subtracting numbers up through 100 Understanding what the different digits mean in a three-digit number Adding and subtracting three digit numbers Measuring lengths of objects in standard units such as inches and centimeters Solving addition and subtraction word problems involving length Solving problems involving money Breaking up a rectangle into same-size squares Dividing circles and rectangles into halves, thirds, or fourths Solving addition, subtraction, and comparison word problems using information presented in a bar graph Writing equations to represent addition of equal numbers Determine the unknown whole number in an equation relating four or more whole numbers. For example, determining the unknown number that makes the equation true in the following: <ol style="list-style-type: none"> $37+10+10 = __ +18$ $?-6=12-4$ $15-9+6=X$ | <ul style="list-style-type: none"> Play math games with your child. For example, "I'm thinking of a number. It has 5 tens, 3 hundreds, and 4 ones. What is the number? 354." Or, using a deck of cards, deal two cards and ask your child to add the two numbers. You can also identify a target number and ask your child to either add or subtract to obtain that target number (use a target of 20 or less). Have your child explain the relationship between different numbers without counting. For example, 147 is 47 more than 100 and three less than 150. Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math. Praise your child when he or she makes an effort and share in the excitement when he or she solves a problem or understands something for the first time. |

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| 3 | <p>In grade three, students will continue to build their concept of numbers, developing an understanding of fractions as numbers. They will learn the concepts behind multiplication and division and apply problem-solving skills and strategies for multiplying and dividing numbers up through 100 to solve word problems. Students will also make connections between the concept of the area of a rectangle and multiplication and addition of whole numbers. Activities in these areas will include:</p> <ul style="list-style-type: none"> • Understanding and explaining what it means to multiply or divide numbers • Multiplying all one-digit numbers from memory (knowing their times table) • Multiplying one-digit numbers by multiples of 10 (such as 20, 30, 40) • Solving two-step word problems using addition, subtraction, multiplication, and division • Understanding the concept of area • Relating the measurement of area to multiplication and division • Understanding fractions as numbers • Understanding and identifying a fraction as a number on a number line • Comparing the size of two fractions • Expressing whole numbers as fractions and identifying fractions that are equal to whole numbers (for example, recognizing that $\frac{3}{1}$ and 3 are the same number) • Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l), and solving word problems involving these measurements; solve one-step word problems involving masses or volumes that are given in the same units. • Representing and interpreting data | <ul style="list-style-type: none"> • Play math games with your child. For example, “I’m thinking of two numbers whose product is between 20 and 30. How many pairs can you think of that would satisfy this problem?” Have your child explain the solutions. How does he or she know that all the number pairs have been identified? • Encourage your child to write or describe numbers in different ways. For example, what are some different ways to make 1450? $1450 = 1$ thousand, 4 hundreds, 5 tens, and 0 ones, or $1000 + 450$, 14 hundreds and 50 ones, 13 hundreds + 15 tens, etc. • Use everyday objects to allow your child to explore the concept of fractions. For example, use measuring cups to have students demonstrate how many $\frac{1}{3}$'s are in a whole, how many $\frac{1}{4}$ cups you need to make $\frac{1}{2}$ cups, and how many times you have to refill a $\frac{1}{2}$ cup measure to make $1\frac{1}{2}$ cups. • Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math. • Praise your child when he or she makes an effort and share in the excitement when he or she solves a problem or understands something for the first time. |
| 4 | <p>In grade four, your child will use addition, subtraction, multiplication, and division to solve word problems, including problems involving measurement of volume, mass, and time. Students will continue to build their understanding of fractions—creating equal fractions, comparing the size of fractions, adding and subtracting fractions, and multiplying fractions by whole numbers. They will also start to understand the relationship between fractions and decimals. Activities in these areas will include:</p> <ul style="list-style-type: none"> • Solving multi-step word problems, including problems involving measurement and converting measurements from larger to smaller units • Multiplying and dividing multi-digit numbers • Extending understanding of fractions by comparing the size of two fractions with different numerators (top numbers) and different denominators (bottom numbers) • Creating equal fractions ($\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8}$) • Adding and subtracting fractions with the same denominator • Building fractions from smaller fractions ($\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$) • Connecting addition and subtraction of whole numbers to multiplying fractions by whole numbers • Connecting addition of fractions to the concept of angle measurement • Representing and interpreting data • Converting fractions with denominators of 10 or 100 into decimals • Locating decimals on a number line • Comparing decimals and fractions using the symbols $>$ (more than), $=$ (equal to), and $<$ (less than) | <ul style="list-style-type: none"> • Use everyday objects to allow your child to explore the concept of fractions. For example, use measuring cups so students see how many times you have to refill a $\frac{1}{4}$ cup to equal a $\frac{1}{2}$ cup or how many $\frac{1}{3}$'s are in two cups. Have students describe two fractions that are equal using a measuring cup (filling a $\frac{1}{4}$ measuring cup twice is the same as filling one $\frac{1}{2}$ measuring cup). • Have your child write or describe fractions in different ways. For example, what are some different ways to make $\frac{3}{4}$? Answers could include $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ or $3 \times \frac{1}{4}$ • Ask your child create and describe equal fractions. For example, have students take a sheet of paper, fold the paper in half, and then unfold and shade $\frac{1}{2}$. Then have students take the same sheet of paper and fold the paper in a half again. Unfold the paper and have students discuss the number of parts that are now shaded. Encourage your child to talk about ways to show that $\frac{1}{2} = \frac{2}{4}$. (Students may continue this process creating other equal fractions.) • Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math. • Praise your child when he or she makes an effort and share in the excitement when he or she solves a problem or understands something for the first time. |
| 5 | <p>In grade five, students will build their understanding of the place value system by working with decimals up to the hundredths place. Students will also add, subtract, and multiply fractions, including fractions with unlike denominators. They will continue to expand their geometry and measurement skills, learning the concept of volume and measuring the volume of a solid figure. Activities in these areas will include:</p> <ul style="list-style-type: none"> • Quickly and accurately multiplying multi-digit whole numbers • Dividing numbers with up to four digits by two digit numbers • Using exponents to express powers of 10 (in 10^2, 2 is the exponent) • Reading, writing, and comparing decimals to the thousandths place • Adding, subtracting, multiplying, and dividing decimals to the hundredths place • Writing and interpreting mathematical expressions using symbols such as parentheses; e.g., “add 8 and 7, then multiply by 2” can be written as $2 \times (8 + 7)$. • Adding and subtracting fractions with unlike denominators (bottom numbers) by converting them to fractions with matching denominators • Multiplying fractions by whole numbers and other fractions • Dividing fractions by whole numbers and whole numbers by fractions • Analyzing and determining relationships between numerical patterns • Measuring volume using multiplication and addition | <ul style="list-style-type: none"> • Use everyday objects to allow your child to explore the concept of fractions. For example, have your child divide a candy bar (or a healthy snack) between three people. Ask, “How much does each person receive?” (Each person would receive $\frac{1}{3}$). Suppose there are three candy bars that you plan to share with two friends. Have your child describe the amount that each person will receive. • Have your child explain how to write fractions in different ways. For example, what are some different ways to write $\frac{4}{3}$? He or she could answer $4 \div 3$, $1\frac{1}{3}$, $\frac{2}{3} + \frac{2}{3}$, $2 \times \frac{2}{3}$, $\frac{8}{6}$, $4 \times \frac{1}{3}$, etc. • Ask your child to give you a fraction equal to a decimal. For example, what are two fractions that can be used to represent 0.6? Answers could include $\frac{6}{10}$, $\frac{60}{100}$, $\frac{12}{20}$, or $\frac{3}{5}$. • Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math. • Praise your child when he or she makes an effort and share in the excitement when he or she solves a problem or understands something for the first time. |

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| 6 | <p>In grade six, your child will learn the concept of rates and ratios and use these tools to solve word problems. Students will work on quickly and accurately dividing multi-digit whole numbers and adding, subtracting, multiplying, and dividing multi-digit decimals. Students will extend their previous work with fractions and decimals to understand the concept of rational numbers—any number that can be made by dividing one integer by another, such as $\frac{1}{2}$, 0.75, or 2. Students will also learn how to write and solve equations—mathematical statements using symbols, such as $20+x = 35$—and apply these skills in solving multi-step word problems. Activities in these areas will include:</p> <ul style="list-style-type: none"> • Understanding and applying the concepts of ratios and unit rates, and using the correct language to describe them (for example, the ratio of wings to beaks in a flock of birds is 2 to 1, because for every 2 wings there is 1 beak) • Building on knowledge of multiplication and division to divide fractions by fractions • Understanding that positive and negative numbers are located on opposite sides of 0 on a number line • Using pairs of numbers, including negative numbers, as coordinates for locating or placing a point on a graph • Writing and determining the value of expressions with whole-number exponents (such as $15+32$) • Identifying and writing equivalent mathematical expressions by applying the properties of operations. For example, recognizing that $2(3+x)$ is the same as $6+2x$ • Understanding that solving an equation such as $2+x = 12$ means answering the question, “What number does x have to be to make this statement true?” • Representing and analyzing the relationships between independent and dependent variables • Solving problems involving area and volume | <ul style="list-style-type: none"> • Ask your child to calculate the unit rates of items purchased from the grocery store. For example, if 2 pounds of flour cost \$3.00, how much does flour cost per pound? • Have your child determine the amount of ingredients needed when cooking. For example, if a recipe calls for 8 cups of rice to serve 4 people, how many cups of rice do you need to serve 6 people? • Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math. • Praise your child when he or she makes an effort, and share in the excitement when he or she solves a problem or understands something for the first time. |
| 7 | <p>In grade seven, students will further develop their understanding of rates and ratios, using tables, graphs, and equations to solve real-world problems involving proportional relationships. Students will also work on quickly and accurately solving multi-step problems involving positive and negative rational numbers—any number that can be made by dividing one integer by another, such as $\frac{1}{2}$, 0.75, or 2. Additionally, students will expand their knowledge of geometry and apply the properties of operations to solve real world problems involving the measurement of multi-dimensional objects. Activities in these areas will include:</p> <ul style="list-style-type: none"> • Determining whether two quantities are in a proportional relationship and using knowledge of rates, ratios, proportions, and percentages to solve multi-step problems • Identifying the unit rate of change (the constant rate at which the value of a variable changes) in tables, graphs, equations, and verbal descriptions • Calculating the unit rates associated with ratios of fractions, including quantities measured in different units (for example, the ratio of $\frac{1}{2}$ a mile for every $\frac{1}{4}$ of an hour means that you travel 2 miles in an hour) • Solving problems using equations to find the value of one missing variable • Applying the properties of operations to generate equivalent mathematical expressions • Solving multi-step word problems by adding, subtracting, multiplying, and dividing positive and negative rational numbers in any form (including whole numbers, fractions, or decimals) • Understanding that numbers cannot be divided by 0 • Converting rational numbers to decimals using long division • Describing situations in which positive and negative quantities combine to make 0 • Finding the area of two-dimensional objects and the volume and surface area of three-dimensional objects | <ul style="list-style-type: none"> • Ask your child to calculate the unit rates of items purchased from the grocery store. For example, if 2 pounds of flour cost \$3.00, how much does flour cost per pound? • Use store advertisements to engage your child in working with numbers. For example, if a store advertises 30% off, have your child estimate the dollar amount of the discount, as well as the sale price of an item. • Have students use four 4’s and any of the four arithmetic operations to write the numbers from 0 to 20 (for example, $44-44=0$; $4\cdot4-4\cdot4 = 0$. How do you get 1? $4/4+4-4=1$). • Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math. • Praise your child when he or she makes an effort, and share in the excitement when he or she solves a problem or understands something for the first time. |
| 8 | <p>In grade eight, students take their understanding of unit rates and proportional relationships to a new level, connecting these concepts to points on a line and ultimately using them to solve linear equations that require them to apply algebraic reasoning as well as knowledge of the properties of operations. Students will also expand their understanding of numbers beyond rational numbers to include numbers that are irrational—meaning that they cannot be written as a simple fraction, such as the square root of 2. Activities in these areas will include:</p> <ul style="list-style-type: none"> • Understanding that every rational number (such as $\frac{1}{2}$, 0.3, 2, or -2) can be written as a decimal, but that the decimal form of an irrational number (such as 2) is both non-repeating and infinite • Applying the properties of exponents to generate equivalent numerical expressions • Determining the value of square roots of small perfect squares (such as the square root of $49=7$) and cube roots of small perfect cubes (such as the cube root of $364=4$) • Graphing proportional relationships and interpreting the unit rate as the slope (how steep or flat a line is) • Solving and graphing one- and two-variable linear equations • Understanding that a function is a rule that assigns to each value of x exactly one value of y, such as $y=2x$, a rule that would yield such ordered pairs as $(-2,-4)$, $(3,6)$, and $(4,8)$ • Comparing the properties of two functions represented in different ways (in a table, graph, equation, or description) • Determining congruence (when shapes are of equal size and shape) and similarity (same shape but different sizes) • Learning and applying the Pythagorean Theorem (an equation relating the lengths of the sides of a right triangle: $a^2 + b^2 = c^2$) • Solving problems involving the volume of cylinders, cones, and spheres | <ul style="list-style-type: none"> • Ask your child to do an Internet search to determine how mathematics is used in specific careers. This could lead to a good discussion and allow students to begin thinking about their future aspirations. • Have your child use magazines, clip art, and other pictures to find and describe examples of similar and congruent figures • Using different objects or containers (such as a can of soup or a shoebox), ask your child to estimate surface area and volume, and check the answer together. • Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math. • Prompt your child to face challenges positively and to see mathematics as a subject that is important. Avoid statements like “I wasn’t good at math” or “Math is too hard.” • Praise your child when he or she makes an effort, and share in the excitement when he or she solves a problem or understands something for the first time. |

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| 9-12 | <p>In high school, students will develop a deep understanding of mathematical concepts and use mathematical ways of thinking to solve real-world problems. Unlike previous grades where learning objectives are organized by grade level, high school learning objectives are organized by concepts—such as algebra, functions, or geometry—that students will learn and master in various mathematics courses. These concepts build on what students learned in grade eight and move toward greater depth of knowledge and skills throughout high school. Here’s a brief snapshot of some of the work students will be doing in these areas:</p> <ul style="list-style-type: none"> • Creating and solving equations (mathematical statements that use letters to represent unknown numbers, such as $2x-6y+z=14$) with two or more variables to describe numbers or relationships • Building an understanding of rational numbers (such as $\frac{3}{4}$) to include rational expressions (such as $\frac{3}{(x-4)}$) • Using the structure of an expression to identify ways to rewrite it. For example, recognizing that x^8-y^8 is the difference between two squares and can also be written $(x^4)^2-(y^4)^2$ • Adding, subtracting, and multiplying polynomials (an expression with multiple terms such as $5xy^2+2xy-7$) • Interpreting the slope of a line as the rate of change in two variables and the intercept as the constant term in a linear model • Building and analyzing functions that describe relationships between quantities and using function notation (for example, $f(x)$ denotes the output of f corresponding to the input of x) • Representing and performing operations with complex numbers (numbers such as $3+5i$, where i is an imaginary number and $i^2 = -1$) • Understanding the rules of probability and using them to interpret data and evaluate the outcomes of decisions • Distinguishing between correlation and causation • Interpreting quantitative and categorical data • Understanding and proving geometric theorems (mathematical statements whose truth can be proven on the basis of previously proven or accepted statements) • Using algebraic reasoning to prove geometric theorems • Applying geometric concepts to model real-life situations | <ul style="list-style-type: none"> • Show your enthusiasm for your child’s study of mathematics. • Encourage your child to be persistent; make sure that he or she knows that mathematics requires patience, practice, and time to think and reflect. • Urge your child to ask the teacher questions either during or after class. • Encourage your child to review class notes every night. If there is something he or she doesn’t understand, tell your child to look at the answers and work backwards to determine how the solution was found. |