Math in Focus Singapore Math ${ }^{\circ}$ by Marshall Cavendish ${ }^{\circ}$

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## Correlation to the

 Common Core State Standards for Mathematics
## Math in Focus ${ }^{\circ}$

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| Standards for Mathematical Practice |  |
| SMP. 1 Make sense of problems and persevere in solving them. <br> How Math in Focus Aligns: <br> Math in Focus is built around the Singapore Ministry of Education's mathematics framework pentagon, which places mathematical problem solving at the core of the curriculum. Encircling the pentagon are the skills and knowledge needed to develop successful problem solvers, with concepts, skills, and processes building a foundation for attitudes and metacognition. Math in Focus is based on the premise that in order for students to persevere and solve both routine and non-routine problems, they need to be given tools that they can use consistently and successfully. They need to understand both the how and the why of math so that they can self-monitor and become empowered problem solvers. This in turn spurs positive attitudes that allow students to solidify their learning and enjoy mathematics. Math in Focus teaches content through a problem solving perspective. Strong emphasis is placed on the concrete-to-pictorial-to-abstract progress to solve and master problems. This leads to strong conceptual understanding. Problem solving is embedded throughout the program |  |


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| SMP. 2 Reason abstractly and quantitatively. <br> How Math in Focus Aligns: <br> Math in Focus' concrete-pictorial-abstract progression helps students effectively contextualize and decontextualize situations by developing a deep mastery of concepts. Each topic is approached with the expectation that students will understand both how it works, and also why. Students start by experiencing the concept through hands-on manipulative use. Then, they must translate what they learned in the concrete stage into a visual representation of the concept. Finally, once they have gained a strong understanding, they are able to represent the concept abstractly. Once students reach the abstract stage, they have had enough exposure to the concept and they are able to manipulate it and apply it in multiple contexts. They are also able to extend and make inferences; this prepares them for success in more advanced levels of mathematics. They are able to both use the symbols and also understand why they work, which allows students to relate them to other situations and apply them effectively. |  |


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| SMP. 3 Construct viable arguments and critique the reasoning of others. <br> How Math in Focus Aligns: <br> As seen on the Singapore Mathematics Framework pentagon, metacognition is a foundational part of the Singapore curriculum. Students are taught to self-monitor, so they can determine whether or not their solutions make sense. Journal questions and other opportunities to explain their thinking are found throughout the program. Students are systematically taught to use visual diagrams to represent mathematical relationships in such a way as to not only accurately solve problems, but also to justify their answers. Chapters conclude with a Put on Your Thinking Cap! problem. This is a comprehensive opportunity for students to apply concepts and present viable arguments. Games, explorations, and hands-on activities are also strategically placed in chapters when students are learning concepts. During these collaborative experiences, students interact with one another to construct viable arguments and critique the reasoning of others in a constructive manner. In addition, thought bubbles provide tutorial guidance throughout the entire Student Book. These scaffolded dialogues help students articulate concepts, check for understanding, analyze, justify conclusions, and self-regulate if necessary. |  |


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| SMP. 4 Model with mathematics. <br> How Math in Focus Aligns: <br> Math in Focus follows a concrete-pictorial-abstract progression, introducing concepts first with physical manipulatives or objects, then moving to pictorial representation, and finally on to abstract symbols. A number of models are found throughout the program that support the pictorial stage of learning. Math in Focus places a strong emphasis on number and number relationships, using place-value manipulatives and place-value charts to model concepts consistently throughout the program. In all grades, operations are modeled with place-value materials so students understand how the standard algorithms work. Even the mental math instruction uses understanding of place value to model how mental arithmetic can be understood and done. These place-value models build throughout the program to cover increasingly complex concepts. <br> Singapore math is also known for its use of model drawing, often called "bar modeling" in the U.S. Model drawing is a systematic method of representing word problems and number relationships that is explicitly taught beginning in Grade 2 and extends all the way to secondary school. Students are taught to use rectangular "bars" to represent the relationship between known and unknown numerical quantities and to solve problems related to these quantities. This gives students the tools to develop mastery and tackle problems as they become increasingly more complex. |  |


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| SMP. 5 Use appropriate tools strategically. <br> How Math in Focus Aligns: <br> Math in Focus helps students explore the different mathematical tools that are available to them. New concepts are introduced using concrete objects, which help students break down concepts to develop mastery. They learn how to use these manipulatives to attain a better understanding of the problem and solve it appropriately. Math in Focus includes representative pictures and icons as well as thought bubbles that model the thought processes students should use with the tools. Several examples are listed below. Additional tools referenced and used in the program include clocks, money, dot paper, place-value charts, geometric tools, and figures. |  |
| SMP. 6 Attend to precision. <br> How Math in Focus Aligns: <br> As seen in the Singapore Mathematics Framework, metacognition, or the ability to monitor one's own thinking, is key in Singapore math. This is modeled for students throughout Math in Focus through the use of thought bubbles, journal writing, and prompts to explain reasoning. When students are taught to monitor their own thinking, they are better able to attend to precision, as they consistently ask themselves, "does this make sense?" This questioning requires students to be able to understand and explain their reasoning to others, as well as catch mistakes early on and identify when incorrect labels or units have been used. Additionally, precise language is an important aspect of Math in Focus. Students attend to the precision of language with terms like factor, quotient, difference, and capacity. |  |

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| SMP. 7 Look for and make use of structure. <br> How Math in Focus Aligns: <br> The inherent pedagogy of Singapore math allows students to look for, and make use of, structure. Place value is one of the underlying principles in Math in Focus. Concepts in the program start simple and grow in complexity throughout the chapter, year, and grade. This helps students master the structure of a given skill, see its utility, and advance to higher levels. Many of the models in the program, particularly number bonds and bar models, allow students to easily see patterns within concepts and make inferences. As students progress through grade levels, this level of structure becomes more advanced. |  |
| SMP. 8 Look for and express regularity in repeated reasoning. <br> How Math in Focus Aligns: <br> A strong foundation in place value, combined with modeling tools such as bar modeling and number bonds, gives students the foundation they need to look for and express regularity in repeated reasoning. Operations are taught with place value materials so students understand how the standard algorithms work in all grades. Even the mental math instruction uses understanding of place value to model how mental arithmetic can be understood and done. This allows students to learn shortcuts for solving problems and understand why they work. Additionally, because students are given consistent tools for solving problems, they have the opportunity to see the similarities in how different problems are solved and understand efficient means for solving them. Throughout the program, students see regularity with the reasoning and patterns between the four key operations. Students continually evaluate the reasonableness of solutions throughout the program; the consistent models for solving, checking, and selfregulation help them validate their answers. |  |


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| Standards for Mathematical Content |  |  |  |
| 5.0A | Operations and Algebraic Thinking |  |  |
| Write and interpret numerical expressions. |  |  |  |
| 5.0A.1 | Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. | SE/TE-5A: <br> Workbook 5A: | $\begin{aligned} & 68-72,86-93,94-101,102-114,115,216-219, \\ & 224-234,242-251,252-257 \\ & 101 \mathrm{~A}, 101 \mathrm{~B}, 101 \mathrm{C}, 108 \mathrm{~A}, 108 \mathrm{~B}, 114 \mathrm{~A}, 114 \mathrm{~B}, \\ & 115 \mathrm{~A}, 234,234 \mathrm{~A}, 234 \mathrm{~B}, 251 \mathrm{~A}, 256,256 \mathrm{~A} \end{aligned}$ |
| 5.OA. 2 | Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. | SE/TE-5A: <br> Workbook 5A: | $\begin{aligned} & 94-101,102-114,115,224-234,257 \\ & 101 \mathrm{~A}, 101 \mathrm{~B}, 101 \mathrm{C}, 108 \mathrm{~A}, 108 \mathrm{~B}, 114 \mathrm{~A}, 114 \mathrm{~B}, \\ & 115 \mathrm{~A}, 234,234 \mathrm{~A}, 234 \mathrm{~B}, 257 \mathrm{~A} \end{aligned}$ |
| Analyze patterns and relationships. |  |  |  |
| 5.0A. 3 | Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. | SE/TE-5A: <br> Workbook 5A: <br> SE/TE-5B: <br> Workbook 5B: | $\begin{aligned} & \hline 216-219 \\ & 223 \mathrm{~A} \\ & \\ & 158-163 \\ & 163 \mathrm{~A}, 163 \mathrm{~B} \end{aligned}$ |
| 5.NBT | Number and Operations in Base Ten |  |  |
| Understand the place value system. |  |  |  |
| 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 $1 / 10$ of what it represents in the place to its left. | SE/TE-5A: <br> Workbook 5A: <br> SE/TE-5B: <br> Workbook 5B: | $\begin{aligned} & 5-15,16-19,20-24,51-63,74-85 \\ & 15 \mathrm{~B}, 15 \mathrm{C}, 19 \mathrm{~A}, 24 \mathrm{~A}, 63 \mathrm{~A}, 63 \mathrm{~B}, 85 \mathrm{~A}, 85 \mathrm{~B} \\ & 7-17,18-22,23-25,36-42,43-52,53-61,62-69 \\ & 17 \mathrm{~A}, 22 \mathrm{~A}, 25 \mathrm{~A}, 25 \mathrm{~B}, 42,42 \mathrm{~A}, 52 \mathrm{~A}, 52 \mathrm{~B}, 61 \mathrm{~A}, \\ & 61 \mathrm{~B}, 69 \mathrm{~A} \end{aligned}$ |
| 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 . | SE/TE-5A: <br> Workbook 5A: <br> SE/TE-5B: <br> Workbook 5B: | $\begin{aligned} & 51-63,64-67,68-73 \\ & 63 \mathrm{~A}, 63 \mathrm{~B}, 67 \mathrm{~A} \\ & 30-35,43-52,62-69 \\ & 52 \mathrm{~A}, 52 \mathrm{~B}, 69 \mathrm{~A} \end{aligned}$ |

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| 5.NBT. 3 | Read, write, and compare decimals to thousandths. |  |  |
| 5.NBT.3.a | Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $\begin{aligned} & 347.392=3 \times 100+4 \times 10+7 \times 1+3 \times(1 / 10)+9 \times \\ & (1 / 100)+2 \times(1 / 1000) \end{aligned}$ | SE/TE-5B: <br> Workbook 5B: | $\begin{aligned} & 7-17,23-25 \\ & 17 \mathrm{~A}, 25 \mathrm{~A}, 25 \mathrm{~B} \end{aligned}$ |
| 5.NBT.3.b | Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons. | SE/TE-5B: <br> Workbook 5B: | $\begin{aligned} & 18-22 \\ & 22 \mathrm{~A} \end{aligned}$ |
| 5.NBT. 4 | Use place value understanding to round decimals to any place. | SE/TE-5B: <br> Workbook 5B: | $\begin{aligned} & 1-6,18-22,53-61,70-76,89-94 \\ & 22 \mathrm{~A}, 61 \mathrm{~A}, 61 \mathrm{~B}, 76 \mathrm{~A}, 94 \mathrm{~A}, 94 \mathrm{~B}, 95 \end{aligned}$ |
| Perform operations with multi-digit whole numbers and with decimals to hundredths. |  |  |  |
| 5.NBT. 5 | Fluently multiply multi-digit whole numbers using the standard algorithm. | SE/TE-5A: <br> Workbook 5A: <br> SE/TE-5B: <br> Workbook 5B: | ```47-50, 51-63, 68-72, 102-114, 115 50A, 63A, 63B, 73A, 73B, 108A, 108B, 114A, 114B, 115A 277-284 284A``` |
| 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. | SE/TE-5A: <br> Workbook 5A: | $\begin{aligned} & 47-50,74-85,86-93,102-114 \\ & 50 \mathrm{~A}, 85 \mathrm{~A}, 85 \mathrm{~B}, 93,93 \mathrm{~A}, 108 \mathrm{~A}, 108 \mathrm{~B}, 114 \mathrm{~A}, \\ & 114 \mathrm{~B} \end{aligned}$ |
| 5.NBT. 7 | Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. | SE/TE-5B: <br> Workbook 5B: | $\begin{aligned} & 7-17,30-35,36-42,43-52,53-61,62-69,70-76 \text {, } \\ & 89-94 \\ & 17 \mathrm{~A}, 22 \mathrm{~A}, 42,42 \mathrm{~A}, 52 \mathrm{~A}, 52 \mathrm{~B}, 61 \mathrm{~A}, 61 \mathrm{~B}, 69 \mathrm{~A} \text {, } \\ & 76 \mathrm{~A}, 94 \mathrm{~A}, 94 \mathrm{~B}, 95 \end{aligned}$ |


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| 5.NF | Number and Operations - Fractions |  |  |
| Use equivalent fractions as a strategy to add and subtract fractions. |  |  |  |
| 5.NF.1 | Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. | SE/TE-5A: <br> Workbook 5A: | $\begin{aligned} & 120-127,128-132,133-136,146-150,151-155 \text {, } \\ & 156-160 \\ & 132 \mathrm{~A}, 132 \mathrm{~B}, 136 \mathrm{~A}, 150 \mathrm{~A}, 155 \mathrm{~A}, 159 \mathrm{~A}, 159 \mathrm{~B}, \\ & 159 \mathrm{C}, 159 \mathrm{D} \end{aligned}$ |
| 5.NF. 2 | Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. | $\begin{aligned} & \text { SE/TE-5A: } \\ & \text { Workbook 5A: } \end{aligned}$ | $\begin{aligned} & 128-132,133-136,156-160 \\ & 132 \mathrm{~A}, 132 \mathrm{~B}, 136 \mathrm{~A}, 159 \mathrm{~A}, 159 \mathrm{~B}, 159 \mathrm{C}, 159 \mathrm{D} \end{aligned}$ |
| Apply and extend previous understandings of multiplication and division to multiply and divide fractions. |  |  |  |
| 5.NF. 3 | Interpret a fraction as division of the numerator by the denominator $(a / b=a \div b)$. Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. | SE/TE-5A: <br> Workbook 5A: | $\begin{aligned} & 137-142,143-145 \\ & 142 \mathrm{~A}, 145 \mathrm{~A} \end{aligned}$ |
| 5.NF. 4 | Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. |  |  |
| 5.NF.4.a | Interpret the product $(a / b) \times q$ as $a$ parts of a partition of $q$ into $b$ equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. | SE/TE-5A: <br> Workbook 5A: | $\begin{aligned} & \text { 172-175, 176-181, 182-183, 189-192 } \\ & 175 \mathrm{~A}, 181 \mathrm{~A}, 181 \mathrm{~B}, 183 \mathrm{~A}, 192 \end{aligned}$ |

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| 5.NF.4.b | Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. | SE/TE-5A: <br> Workbook 5A: | $\begin{aligned} & 172-175,182-183,267-270 \\ & 175 \mathrm{~A}, 183 \mathrm{~A}, 270,270 \mathrm{~A} \end{aligned}$ |
| Perform operations with multi-digit whole numbers and with decimals to hundredths. |  |  |  |
| 5.NF.5 | Interpret multiplication as scaling (resizing), by: |  |  |
| 5.NF.5.a | Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. | SE/TE-5A: <br> Workbook 5A: | $\begin{aligned} & 184-188,296-302,316-321,322-331 \\ & 188 \mathrm{~A}, 302,321 \mathrm{~A}, 331 \mathrm{~A}, 331 \mathrm{~B} \end{aligned}$ |
| 5.NF.5.b | Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a / b=$ $(n \times a) /(n \times b)$ to the effect of multiplying $a / b$ by 1 . | SE/TE-5A: <br> Workbook 5A: | $\begin{aligned} & \hline 184-188 \\ & 188 \mathrm{~A} \end{aligned}$ |
| 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. | SE/TE-5A: <br> Workbook 5A: | 176-181, 184-188, 189-192, 200-210, 211 $181 \mathrm{~A}, 181 \mathrm{~B}, 188 \mathrm{~A}, 192,210 \mathrm{~A}, 210 \mathrm{~B}, 211 \mathrm{~A}$ |




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| Classify two-dimensional figures into categories based on their properties. |  |  |  |
| $5 . \mathrm{G.3}$ | Understand that attributes belonging to a category of two- <br> dimensional figures also belong to all subcategories of <br> that category. | SE/TE-5A: <br> Workbook 5A: | 276-282 <br> 281 A |
|  |  | SE/TE-5B: | $212-216,221-230,237-249$ |
|  |  | Workbook 5B: | $216 \mathrm{~A}, 230 \mathrm{~A}, 230 \mathrm{~B}, 249$ |

