magma

ALIGNMENT GUIDE

Grade 4

What this document covers

Part 1: ELPS Integration

Magma Math is designed to support emergent bilingual (EB) students across all four ELPS language domains: listening, speaking, reading, and writing. The platform includes built-in features that reduce linguistic barriers while maintaining rigorous, grade-level mathematical content. The features described below are available across all grade levels and learning pathways.

Multilingual Translation and Text-to-Speech

Magma Math provides high-quality translation of all student-facing content, including problem text and instructions, into over 140 languages. This translation is paired with a text-to-speech feature that reads content aloud while highlighting each word in real time as it is spoken. This dual modality directly supports multiple ELPS expectations:

ELPS (1)(B), Listening. Students can hear content-specific mathematical vocabulary pronounced accurately in English or their home language, supporting comprehension of grade-level terms during both formal and informal interactions with the platform.

ELPS (1)(F), Listening. The text-to-speech feature functions as an auditory multimedia source from which students derive meaning to build and reinforce both mathematical concepts and language acquisition. The word-by-word highlighting synchronizes visual and auditory input, reinforcing the connection between written and spoken forms of academic language.

ELPS (3)(C), Reading. By providing translated content alongside the original English, students can leverage contextual factors and cognates to comprehend content-area vocabulary in text. A student encountering a word problem can toggle to their home language to confirm understanding of context before solving in the mathematical register.

ELPS (3)(F), Reading. Students derive meaning from content-area texts using visual, contextual, and linguistic supports. Magma Math's translated text serves as linguistic support, while the platform's visual problem representations (grids, number lines, area models, diagrams) provide language-independent visual support.

Visual and Multimodal Problem Representations

Across all learning pathways, Magma Math presents problems using visual models that communicate mathematical relationships without relying solely on text. These include hundred grids, number lines, fraction bars, area models, coordinate planes, and geometric diagrams. These representations support:

ELPS (4)(C), Writing. Students write responses using a combination of high-frequency words and content-area vocabulary as they interact with problems that pair visual models with mathematical notation. The visual context scaffolds written mathematical expression.

ELPS (2)(E), Speaking. When teachers use Magma Math problems as anchors for classroom discussion, the visual representations provide EB students with concrete referents for narrating, describing, explaining, and justifying their mathematical reasoning with increasing specificity and detail.

Part 2: Course-Level Design (Horizontal Alignment)

Program Context

Magma Math is a TEKS-aligned digital supplemental resource. Content is organized into learning pathways that function like chapters in a traditional curriculum. Each pathway bundles related TEKS and key concepts so teachers can assign coherent sets of problems, even though Magma does not prescribe a day-by-day lesson sequence.

Rationale for Grade 4 Learning Paths

The Grade 4 scope and sequence is organized into three Instructional Strands that mirror the mathematical strands defined in the TEKS introduction for Grades 3-5. TEKS within the same strand at a given grade level relate to the same big idea, and TEKS across strands connect in a variety of ways. These strands are designed to build conceptual understanding before application, connecting patterns, big ideas, and relationships within the grade so that students see later topics as extensions of earlier ones rather than isolated skills. Mathematics tells a continuous, connected story, and the strand organization ensures that Grade 4 students experience that story coherently throughout the year.

Strand 1: Number and Operations (Chapters 1-5)

Grade 4 begins by deepening students' understanding of the base-10 number system. Chapter 1 (Understanding Place Value of Whole Numbers) extends Grade 3 work with four- and five-digit numbers to larger multi-digit whole numbers, emphasizing that the value of a digit changes by a factor of ten when its place changes (TEKS 4.2A-D). Chapter 2 (Understanding Decimals) introduces tenths and hundredths as additional positions in the same place value chart. Mild entry points here use shaded 10×10 grids where students count colored squares to identify decimal values, grounding the abstract notation in a concrete visual before transitioning to symbolic comparison and ordering (TEKS 4.2B, 4.2E-H). Chapter 3 (Fractions) links fractions to this number-system work by placing fractions and decimals on number lines and connecting benchmark fractions to familiar decimal values (TEKS 4.3). Chapters 4 and 5 then develop computational fluency: Chapter 4 (Adding and Subtracting) integrates both whole numbers and decimals so students must apply the place value rules from Chapters 1-2 when lining up digits and regrouping (TEKS 4.4A), and Chapter 5 (Multiplication and Division of Whole Numbers) develops flexible strategies and algorithms for multi-digit multiplication and division (TEKS 4.4B-F, 4.4H).

Strand 2: Algebraic Reasoning (Chapters 6-7)

Once number sense and computational fluency are established, the focus shifts to algebraic reasoning. Chapter 6 (Multistep Problems) serves as a synthesis pathway where students represent and solve two-step and multistep word problems with all four operations, using equations with unknowns (TEKS 4.4G-H, 4.5A). Medium-level tasks here present real-world scenarios where students must write equations with a variable to represent a situation, such as determining an unknown score in a game or an unknown cost in a purchase, then solve using the operations they mastered in Strand 1. Chapter 7 (Patterns, Perimeter, and Area) extends algebraic reasoning by having students generate and analyze numerical patterns through input-output tables, explore shape patterns, and connect perimeter and area formulas to multiplication from Chapter 5 (TEKS 4.5B-D).

Strand 3: Geometry, Measurement, and Data Analysis (Chapters 8-11)

The final strand applies the skills from Strands 1 and 2 to geometric, measurement, and data contexts. Chapters 8-9 (2D Shapes; Angles and Circles) have students classify two-dimensional figures by geometric properties and measure angles using protractors (TEKS 4.6-4.7). Spicy problems here move beyond routine measurement into applied contexts, such as estimating the angle of a raised drawbridge from a traffic sign image. Chapter 10 (Calculations with Units and Unit Conversion) connects arithmetic to metric and customary measurement systems (TEKS 4.8), with Spicy problems requiring students to coordinate multiple unit conversions within a single real-world scenario. Chapter 11 (Data Analysis) uses fractions and decimals in frequency tables, line plots with fractional values, and stem-and-leaf plots (TEKS 4.9). The sequencing is intentional: perimeter and area tasks in Chapter 7 assume multiplication fluency from Chapter 5, so students' cognitive energy is focused on understanding geometric relationships, not basic computation.

Artifact 2.1: Grade 4 Scope and Sequence

Seq	Chapter (Learning Pathway)	Subchapters	Focus TEKS
1	**Understanding place value of whole numbers**	Relationship between digits; Place value of multi-digit whole numbers; Compare 6-digit whole numbers; Compare whole numbers over 1,000,000; Rounding multi-digit whole numbers	4.2.A-4.2.D
2	**Understanding decimals**	Place value of decimals to hundredths; Visual representations of decimals; Comparing decimals to hundredths; Relating fractions and decimals; Decimals on the number line	4.2.B, 4.2.E-4.2.H
3	**Fractions**	Decomposing fractions; Equivalent fractions; Comparing fractions; Adding fractions (same denominator); Adding and subtracting mixed numbers; Fractions on the number line; Subtracting fractions (same denominator)	4.3.A-4.3.G
4	**Adding and subtracting**	Adding multi-digit whole numbers; Subtracting multi-digit whole numbers; Adding decimals to hundredths; Subtracting decimals to hundredths	4.4.A

5	**Multiplication and division of whole numbers**	Multiplying single digits by 10 and 100; Multiplying 2-digit numbers; Multiplying 3- and 4-digit by 1-digit numbers; Dividing up to 4-digits by 1-digit numbers; Representations of remainders; Perfect squares	4.4.B-4.4.F, 4.4.H
6	**Multistep problems**	Estimate sums, differences, products, and quotients; Two-step word problems; Multistep word problems (with remainder); Word problems as equations with unknown	4.4.G, 4.4.H, 4.5.A
7	**Patterns, perimeter, and area**	Numerical patterns as input-output tables; Shape patterns; Perimeter of polygons; Area of rectangles	4.5.B-4.5.D
8	**2D shapes**	Points, lines, rays, and line segments; Parallel, intersecting, and perpendicular lines; Lines of symmetry; Classifying triangles by angles; Quadrilaterals	4.6.A-4.6.D
9	**Angles and circles**	Angles and circles; Measuring angles; Adjacent angles	4.7.A-4.7.C, 4.7.E
10	**Calculations with units and unit conversion**	Metric system prefixes (kilo to milli); Converting length; Converting volume and weight; Converting time units; Money word problems	4.8.A-4.8.C
11	**Data analysis**	Tables and frequency tables; Line plot (with fractions); Stem and leaf plots	4.9.A, 4.9.B

Part 3: Vertical Alignment (K-6 Learning Progressions)

Vertical Rationale

Magma Math is built on a coherent progression where concepts spiral in complexity across grades. TEKS across grade levels within the same strand have a relationship between mathematical concepts, and the key concepts for each grade level build on previous foundations while preparing students for future learning. Grade 4 sits at the center of the K-6 continuum: it assumes concrete experiences with counting, equal shares, arrays, and area from K-3 and prepares students for fraction and decimal operations, algebraic reasoning, and geometric measurement in Grades 5-6. Below, we trace six key mathematical strands from Kindergarten through Grade 6, with Grade 4 as the central reference point. This strategic progression of learning ensures that new understandings are built on previous foundations, and that students experience mathematics as an interconnected system rather than a set of disconnected skills.

Number System and Place Value

In Kindergarten and Grade 1, students build foundational number sense by counting, reading, and writing numbers to 20 and then to 120, composing and decomposing numbers, and understanding tens and ones (TEKS K.2, 1.2). Grade 2 extends this to reading, writing, and comparing numbers within 1,200 and deepens place value understanding to hundreds (TEKS 2.2). Grade 3 introduces 4- and 5-digit numbers with standard, word, and expanded forms, and students begin comparing and ordering on number lines (TEKS 3.2). Grade 4 then extends place value understanding in two critical directions: to larger multi-digit whole numbers (comparing and rounding numbers over 1,000,000) and to decimals through hundredths, making explicit that tenths and hundredths are part of the existing base-10 system rather than a new set of rules (TEKS 4.2). This dual extension is the pivot point in the strand. In Grade 5, students deepen decimal understanding through thousandths and begin rounding decimals (TEKS 5.2). In Grade 6, the number system expands to include all rational numbers: integers, opposites, absolute value, and ordering across the full rational number line (TEKS 6.2).

Fractions and Rational Numbers

Kindergarten and Grade 1 lay informal groundwork through partitioning shapes into halves and quarters (TEKS K.6, 1.6.H). Grade 2 formalizes this by having students identify halves and quarters in shapes and partition 2D figures (TEKS 2.3). Grade 3 is the first deep dive into fractions: students work with unit fractions, represent fractions with strip diagrams, area models, and number lines, explore equivalence, and compare fractions with the same numerator or denominator (TEKS 3.3, 3.7A). Grade 4 pivots from fraction concepts to fraction operations: students decompose fractions, generate equivalent fractions, compare fractions with unlike denominators, and add and subtract fractions and mixed numbers with like denominators (TEKS 4.3). This is where fractions shift from "part of a whole" to "quantities you compute with." Grade 5 requires fluency with addition and subtraction of fractions with unlike denominators and introduces multiplication and division of fractions (TEKS 5.3H-L). Grade 6 extends to operations on all positive rational numbers, including dividing fractions by fractions and interpreting multiplication as scaling (TEKS 6.3).

Operations

Kindergarten focuses on adding and subtracting within 10 using objects and images (TEKS K.3). Grade 1 extends to addition and subtraction within 20, introducing strategies like making a 10, doubles, and counting on (TEKS 1.3, 1.5). Grade 2 builds fluency with 2-digit operations and extends to 3-digit addition and subtraction within 1,000, while also introducing multiplication and division as equal groups (TEKS 2.4, 2.6). Grade 3 develops multiplication and division fact fluency through 10×10, connects these to arrays and equal groups, and begins multi-digit multiplication of 2-digit by 1-digit numbers (TEKS 3.4-3.5). Grade 4 extends this in two ways: multi-digit multiplication (2-digit × 2-digit and 3/4-digit × 1-digit) and division with up to 4-digit dividends, including interpreting remainders (TEKS 4.4). Grade 5 demands fluency with larger whole-number operations and extends these operations to decimals and fractions (TEKS 5.3). Grade 6 completes the computational progression by requiring fluency with all operations on positive rational numbers and introducing integer operations (TEKS 6.3).

Algebraic Reasoning

Algebraic reasoning develops gradually across the elementary grades, growing from informal pattern work into formal expressions and equations. In Kindergarten and Grade 1, students identify and extend simple patterns with objects and numbers (TEKS K.5, 1.5). Grade 2 introduces even and odd numbers and finding 10 or 100 more or less than a given number, laying early groundwork for functional thinking (TEKS 2.7). Grade 3 formalizes this with unknowns in multiplication and division equations, real-world relationships represented with number pairs, and input-output tables (TEKS 3.5). Grade 4 is a pivotal year: students use strip diagrams and equations with a letter standing for the unknown to represent multistep problems (TEKS 4.5A), and they generate and analyze numerical patterns through input-output tables and shape patterns (TEKS 4.5B). Grade 5 extends to evaluating variable expressions, describing the meaning of parentheses and brackets, and applying order of operations with grouping symbols (TEKS 5.4B-F). Grade 6 then makes the transition to formal algebra: students distinguish between expressions and equations, generate equivalent expressions using properties of operations, write and solve one-variable one-step equations and inequalities, represent solutions on number lines, and explore dependent and independent variables (TEKS 6.7, 6.9-6.10). This progression ensures that the shift from arithmetic to algebraic reasoning is gradual and grounded in the operational fluency students developed across earlier grades.

Geometry and Measurement

In Kindergarten and Grade 1, students identify and describe 2D and 3D shapes by their attributes and begin measuring with non-standard and standard units (TEKS K.6-K.7, 1.6-1.7). Grade 2 extends to area using unit squares and measurement with rulers (TEKS

2.8-2.9). Grade 3 formalizes area and perimeter: students tile rectangles, count unit squares, and compute perimeter by adding side lengths (TEKS 3.6-3.7). Grade 4 abstracts these experiences into formulas: perimeter as a sum and area as length times width. Students also classify 2D shapes by geometric properties, measure angles, and convert units across metric and customary systems (TEKS 4.5-4.8). Grade 5 extends to volume of rectangular prisms, connecting area models to the formula $V = l \times w \times h$ and deepening understanding of measurement as multiplicative (TEKS 5.4-5.6). Grade 6 introduces area of triangles, parallelograms, and trapezoids, volume of prisms with fractional side lengths, and coordinate graphing (TEKS 6.8, 6.11).

Data Analysis

Kindergarten and Grade 1 introduce representing and interpreting data through pictographs, picture graphs, and simple bar graphs with single-unit scales (TEKS K.8, 1.8). Grade 2 extends to bar graphs and pictographs with multi-unit scales (TEKS 2.10). Grade 3 adds line plots, frequency tables, and pictographs with 2, 5, or 10-unit scales (TEKS 3.8). Grade 4 builds on all of these by introducing line plots with fractional values and stem-and-leaf plots, explicitly linking data analysis to the fraction and decimal work from Strand 1 (TEKS 4.9). Grade 5 extends to scatterplots and solving multi-step problems with data representations (TEKS 5.9). Grade 6 introduces formal statistical measures (mean, median, mode, range, interquartile range) and more complex data displays, including box plots, histograms, and dot plots with rational number values (TEKS 6.12-6.13).

Part 4: Coherence and Concept Depth

Within-Pathway Coherence

Within each subchapter, Magma Math sequences problems to scaffold student understanding from concrete models to abstract applications. Because Magma does not prescribe a lesson sequence, this coherence appears in the structure of each learning pathway: students encounter tasks that move from models and visual supports to symbolic procedures and then to multistep applications. This ensures that students are not just memorizing procedures but building durable understanding of mathematical relationships.

The Scaffolding Framework: Mild, Medium, and Spicy

Magma Math uses a three-level scaffolding framework, Mild, Medium, and Spicy (M/M/S), that aligns with standards-based grading principles. The framework is grounded in a simple premise: every problem in a subchapter assesses the same grade-level standard. What changes across levels is not the mathematical content, but the degree of support provided to the student and the strategic demand of the task. Levels are visible only to teachers while they are creating assignments, although they may choose to reveal them to students if they so choose.

This approach ensures that all students, regardless of their entry point, are engaged with on-grade-level content. The levels are not remediation or acceleration. They are a deliberate instructional sequence that removes scaffolding incrementally and then increases strategic complexity, all within the boundaries of the current grade's TEKS.

Level	Characteristics
Mild	Students work on the course-level standard with structured support. Problems include visual models, simplified numerical contexts, and direct prompts that isolate the core concept. The goal is to build confidence and activate prior knowledge while keeping students engaged with the current course's mathematics.
Medium	Students demonstrate the standard as written, without scaffolding. Visual supports are removed unless the standard itself requires interpreting a representation. Numbers reflect the full complexity expected at the course level, and routine word problems require students to independently determine the appropriate operation or strategy.
Spicy	Students apply the same course-level mathematics to tasks that require an additional layer of strategic thinking. This may involve error analysis, working backwards from a solution, synthesizing multiple pieces of information, or applying the concept in a non-routine context. The mathematical content does not advance to a future course level. Instead, cognitive demand increases through the task's structure and framing.

> **Design principle:** Magma Math sections progress by removing supports (Mild to Medium) and then increasing strategic thinking (Medium to Spicy), without drifting into past or future course-level standards. A problem is not made Mild by reverting to middle school content, and a problem is not made Spicy by introducing Algebra II content or simply increasing numerical complexity.

Connecting Prior Knowledge to Current and Future Learning

The M/M/S progression serves as the mechanism by which Magma Math connects students' prior knowledge to the mathematical concepts and procedures they are learning in Grade 4 and will encounter in future grades. This connection operates across four dimensions: prior conceptual knowledge and prior procedural knowledge, each linked to both current and future learning.

Connecting Prior Conceptual Knowledge to Current Grade-Level Learning

At the Mild level, problems activate students' prior conceptual understanding from earlier grades by using familiar models and representations while introducing a new Grade 4 concept. In the Understanding Decimals pathway (TEKS 4.2E), Mild problems present shaded 10×10 grids where students count colored squares to determine the decimal value represented. This directly parallels the area-model and partitioned-whole experiences students developed in Grade 3 fraction work (TEKS 3.3), bridging the prior concept of "parts of a whole" to the new concept of decimal place value. Similarly, in the Fractions pathway (TEKS 4.3G), Mild problems place a labeled point on a number line divided into equal segments, asking students to identify the fraction. The number line model connects to Grade 3 work with fractions as distances from zero (TEKS 3.7A), ensuring students build new understanding on a foundation they already possess.

Connecting Prior Procedural Knowledge to Current Grade-Level Learning

At the Medium level, students apply and extend procedural skills they developed in earlier grades to perform current grade-level tasks. In the Adding and Subtracting pathway (TEKS 4.4A), Medium problems present multi-digit addition and subtraction in standard algorithm format with no visual scaffolding, numbers in the thousands, and regrouping required across multiple place values. Students rely on procedural fluency with regrouping developed across Grades 2 and 3 (TEKS 2.4, 3.4A). In the same pathway, decimal subtraction tasks at the Medium level require students to extend their whole-number subtraction procedures to new number types, lining up place values and borrowing across the decimal point. The scaffolding is removed; the procedural foundation from prior years carries the weight.

Connecting Current Learning to Future Conceptual Demands

At the Spicy level, problems foreshadow future conceptual demands by requiring students to synthesize, generalize, or transfer concepts. In the Fractions pathway (TEKS

4.3D, 4.3F), Spicy problems ask students to find a fraction satisfying multiple simultaneous conditions: greater than one benchmark, less than another, with a specified denominator. This multi-constraint reasoning previews the demands of Grade 5, where students compare and operate on fractions with unlike denominators (TEKS 5.3H). In the Rounding pathway (TEKS 4.2D), Spicy problems present the reverse direction: given the rounded result, determine which original numbers could produce it. This type of backward reasoning about estimation previews the reasonableness judgments demanded in Grade 5 and 6 computational contexts. The mathematical content stays within Grade 4, but the strategic complexity builds conceptual habits that future grades require.

Connecting Current Learning to Future Procedural Demands

The progression also prepares students procedurally for future grades. As students move from Mild to Medium within a Grade 4 subchapter, they internalize procedures that become prerequisite fluencies in Grade 5 and beyond. In the Multiplication pathway (TEKS 4.4C, 4.4D), Medium problems develop fluency with partial products and the standard algorithm for multi-digit multiplication. Grade 5 assumes this fluency in the context of multiplying decimals by whole numbers (TEKS 5.3D) and computing area and volume (TEKS 5.4G-H). At the Spicy level, problems in the same pathway require students to coordinate multiple operations and interpret real-world constraints, such as computing weekly factory output while accounting for half-day and closed-day schedules (TEKS 4.4D). This procedural complexity directly prepares students for the multistep rational-number problems in Grade 5 (TEKS 5.3). The M/M/S structure ensures that procedural fluency is not developed in isolation but within a coherent progression that serves both current mastery and future readiness.

Across all four dimensions, the M/M/S structure ensures that each problem type within a subchapter builds on the one before it, and the full progression connects backward to foundational knowledge and forward to future learning goals.

Part 5: Types of Content and Representations

Concrete, Representational, and Abstract Models

Magma Math provides opportunities for students to engage with mathematical concepts through concrete models, pictorial representations, and abstract (symbolic/numeric/algorithmic) models, as required by the TEKS. The M/M/S scaffolding structure maps naturally to the Concrete-Representational-Abstract (CRA) progression: Mild problems tend to anchor understanding in concrete and pictorial models, Medium problems transition to abstract procedures, and Spicy problems require flexible movement between representations.

Mild problems across the program use a range of visual representations to ground new concepts before students work symbolically. In the Adding and Subtracting pathway (TEKS 4.4A), base-10 block models accompany decimal addition problems: students see orange columns of ten blocks representing whole units alongside a separate row of individual blocks representing tenths, connecting the visual grouping directly to place value structure. In the Understanding Decimals pathway (TEKS 4.2E), shaded 10×10 grids make tenths and hundredths countable: a grid with five full columns and two additional squares shaded represents 0.52, and students identify the value before ever writing the decimal notation. In the Fractions pathway (TEKS 4.3G), number lines divided into equal segments with a labeled point allow students to read fractions as distances, bridging the pictorial to the numeric. In the Geometry strand, protractor images with rays aligned to specific degree marks provide a concrete measurement context for angle classification (TEKS 4.6C, 4.7C).

Medium problems remove these visual supports and require students to work with symbolic and algorithmic representations. Addition of multi-digit whole numbers appears in standard vertical format without blocks or grids. Fraction comparison requires reasoning about numerators and denominators without visual partitioning. Angle classification is based on degree measurements without protractor images. This deliberate removal of the concrete scaffold is what distinguishes Medium from Mild: the mathematical content is the same, but the representational demand shifts to the abstract.

Spicy problems frequently require students to create representations and to define or explain how those representations connect to abstract concepts. In the Multiplication pathway (TEKS 4.4C), Spicy tasks ask students to justify a computation using an area model, requiring them to construct the pictorial representation and explain how its structure corresponds to the symbolic product. In the Data Analysis pathway (TEKS 4.9A), students create line plots from raw data tables, selecting appropriate scales and labels, then use those displays to answer interpretive questions that connect the visual back to numeric reasoning. In the Fractions pathway (TEKS 4.3A), Mild problems ask students to decompose a fraction into a sum of unit fractions and write the resulting expression, a task that requires creating a symbolic representation and defining what each unit fraction means in relation to the whole. Throughout the program, students are not only interpreting provided models but actively constructing, defining, and explaining how concrete and pictorial representations relate to the abstract mathematical concepts they encode.

Interpreting, Analyzing, and Evaluating

Magma Math problems across all levels require students to interpret, analyze, and evaluate mathematical concepts and situations, not merely compute. This is built into the M/M/S framework by design.

At the Mild level, interpretation is the primary cognitive demand. Students read a line plot and identify the most common value, interpret a shaded grid to determine a decimal, or evaluate whether a drawn line satisfies the definition of symmetry. These tasks activate comprehension before computation.

At the Medium level, analysis takes center stage. Comparing decimals like 1.2 and 0.99 requires analyzing the place value structure to determine relative magnitude, not just computing. Interpreting a stem-and-leaf plot to determine what fraction of students failed a test requires analyzing a data display and connecting it to a fractional representation.

At the Spicy level, evaluation is front-and-center. Tasks ask students to evaluate a peer's geometric classification and identify why it is incorrect, assess which of several complex expressions yield the same result, or determine which statements accurately describe the distribution of a dataset. These problems demand judgment, not just execution.

Applying Conceptual Understanding to New Situations

Spicy problems throughout Magma Math are specifically designed to require transfer of conceptual understanding to non-routine contexts. These are not simply harder computations; they are novel situations that demand flexible thinking.

In the Unit Conversion pathway (TEKS 4.8B), Spicy problems set tasks in unfamiliar contexts where students must coordinate multiple conversion steps within a single scenario, such as comparing two durations expressed in different units before combining them. In the Division pathway (TEKS 4.4F), a Spicy problem reverses the typical computation: given an area and one side length, students reason backwards to find the missing dimension, applying their conceptual understanding of area as a multiplicative relationship in a new direction. In the Multistep Problems pathway (TEKS 4.5A), Spicy tasks layer constraints and require students to track quantities across multiple operations, synthesizing skills from across Strand 1 in a single extended scenario.

Automaticity, Fluency, and Efficiency

Medium problems across all chapters are the primary vehicle for developing student automaticity and fluency with grade-level procedures. Because each subchapter contains multiple problems at the Medium level targeting the same standard, students encounter repeated opportunities to practice key procedures without scaffolding. This structured repetition builds automaticity: students internalize the steps of the standard algorithm, the mechanics of fraction comparison, or the routine of unit conversion so that execution becomes reliable and efficient over time. Because Medium problems test the standard as written, they require students to carry out procedures accurately and efficiently using the number types and contexts expected at the grade level.

Spicy problems then provide opportunities for students to evaluate mathematical representations, strategies, and solutions for efficiency, flexibility, and accuracy. Tasks that present multiple equivalent expressions and ask students to determine which ones produce the same result require evaluating different computational paths for efficiency. Error analysis tasks, where a student must identify a peer's incorrect geometric classification and explain the flaw, develop the habit of evaluating solutions for accuracy. And problems that can be approached through multiple valid methods, such as using either an area model or the standard algorithm to justify a multiplication result, build procedural flexibility by requiring students to select, compare, and reason about different strategies rather than relying on a single approach.

Part 6: Process Standards Integration

Overview

The TEKS process standards (b)(1)(A) through (G) are not taught in isolation within Magma Math. They are woven into the content of every learning pathway through the design of the problems themselves. Because Magma Math is a problem-based platform, every student interaction is an opportunity to engage with one or more process standards. The M/M/S scaffolding structure ensures that process standards are engaged at every level of complexity: Mild problems emphasize selecting tools and creating representations (C, E), Medium problems emphasize applying mathematics and communicating ideas (A, D), and Spicy problems emphasize analyzing relationships, justifying reasoning, and evaluating problem-solving processes (B, F, G).

How Process Standards Are Incorporated Throughout Learning Pathways

(A) Apply mathematics to everyday life, society, and the workplace

Real-world contexts are embedded across all three M/M/S levels and throughout every strand. At the Mild level, students encounter accessible scenarios such as counting coins and calculating simple totals (TEKS 4.8C). At the Medium level, problems situate operations in realistic contexts: splitting an inheritance equally among siblings engages division (TEKS 4.4F), and tracking a gym trainer's weekly sessions engages multiplication and addition (TEKS 4.5A). At the Spicy level, multi-constraint real-world problems bring several skills together, such as computing a lemonade stand's profit by coordinating fixed costs, variable costs, and revenue across 100 units sold (TEKS 4.10B). Process standard (A) is embedded most densely in the Multistep Problems pathway (Chapter 6) and throughout the Measurement pathway (Chapter 10), but it appears across every strand.

(B) Use a problem-solving model: analyze, formulate, determine, justify, evaluate

Spicy problems consistently require students to engage the full problem-solving cycle. In the Division pathway (TEKS 4.4F), a Spicy task describes a multi-step division scenario where a student must analyze two sequential division results, formulate a strategy for working backwards through both steps, determine the original number, and evaluate whether the answer is consistent with all given conditions. In the Rounding pathway (TEKS 4.2D), Spicy tasks present the reverse problem: given that a number rounds to two different values at different place-value levels, students must analyze the rounding rules, formulate the set of candidates, and evaluate which number satisfies both constraints simultaneously.

(C) Select tools, including real objects, manipulatives, paper and pencil, and technology

Mild problems explicitly provide or reference tools for students to use. In the Angles pathway (TEKS 4.7C), students read measurements from a protractor image displayed alongside the problem. In the Adding and Subtracting pathway (TEKS 4.4A), base-10 block representations scaffold decimal addition. In the Rounding pathway (TEKS 4.2D), a number line with labeled benchmarks supports estimation. As students progress to Medium and Spicy, the explicit tool provision is removed, and students must select appropriate mental strategies, estimation techniques, or computational approaches independently.

(D) Communicate mathematical ideas using multiple representations

Problems across all levels engage multiple representations: symbolic notation, visual models, tables, graphs, and verbal descriptions. In the Data Analysis pathway (TEKS 4.9A), Medium tasks require students to translate between tabular data and a line plot, constructing a visual display from numeric information and interpreting it in context. In the Multistep Problems pathway (TEKS 4.5A), Medium tasks require translating a verbal real-world description into a symbolic equation with a variable, then solving. In the Multiplication pathway (TEKS 4.4D), Spicy tasks ask students to compute a product and then justify their answer using an area model, communicating the same mathematical idea through both numeric and pictorial means.

(E) Create and use representations to organize, record, and communicate

Students create their own representations throughout Magma Math. In the Data Analysis pathway (TEKS 4.9A), tasks ask students to construct a line plot from a raw data table, including choosing a title and labeling units along the axis. In the Fractions pathway (TEKS 4.3A), students create decomposition expressions, writing a fraction as a sum of unit fractions. In the Patterns pathway (TEKS 4.5B), students generate input-output tables from a given rule. These tasks go beyond interpreting provided representations; students must organize data, select appropriate formats, and construct displays that communicate mathematical relationships.

(F) Analyze mathematical relationships to connect and communicate

Problems requiring relational analysis appear across all strands. In the Fractions pathway (TEKS 4.3D, 4.3F), Spicy tasks ask students to find a fraction satisfying multiple constraints simultaneously (greater than one benchmark, less than another, with a specific denominator), requiring analysis of the relationships among comparison, equivalence, and denominator structure. In the Patterns pathway (TEKS 4.5B), students analyze repeating and growing patterns to predict subsequent values, connecting observed regularity to a generalizable rule. In the Geometry pathway (TEKS 4.5C), area and perimeter problems connect multiplication from Strand 1 to geometric measurement in Strand 3, requiring students to analyze how operations relate to spatial attributes.

(G) Display, explain, and justify using precise mathematical language

Explain and justify prompts appear at every level. At the Mild level, tasks such as determining whether a number is a perfect square include the prompt "Explain" (TEKS 4.4C), asking students to articulate their reasoning even on accessible problems. At the Medium level, true-or-false tasks about geometric properties (such as whether perpendicular lines are always intersecting) require students to justify a claim using precise definitions (TEKS 4.6A). At the Spicy level, error analysis tasks present a peer's incorrect geometric classification and ask students to identify the flawed reasoning, select the correct properties, and explain why the original claim was wrong (TEKS 4.6D). These tasks develop mathematical argumentation across the full range of complexity.

Process Standards by Chapter

The following table provides an overview of the primary process standards engaged in each learning pathway. All chapters engage process standard (A) through real-world contexts and (D) through multiple representations. The table highlights additional emphasis areas:

Chapter	Primary Process Standards Emphasis
Ch 1-2: Place Value & Decimals	(C) Selecting tools: number lines, grids, place value charts. (E) Creating representations of numbers in multiple forms.
Ch 3: Fractions	(D) Multiple representations: number lines, area models, symbolic notation. (F) Analyzing relationships between equivalent fractions.
Ch 4-5: Operations	(B) Problem-solving models for multi-step computation. (G) Explaining strategies such as partial products and standard algorithms.
Ch 6: Multistep Problems	(A) Real-world application across all four operations. (B) Full problem-solving cycle: analyze, formulate, solve, justify.
Ch 7: Patterns, Perimeter, Area	(F) Analyzing patterns and geometric relationships. (E) Creating input-output tables and area models.
Ch 8-9: Shapes & Angles	(C) Selecting tools: protractors, rulers. (G) Classifying and justifying geometric properties.
Ch 10: Unit Conversion	(A) Real-world measurement contexts. (B) Multi-step conversion requiring strategic planning.
Ch 11: Data Analysis	(E) Creating line plots, frequency tables, stem-and-leaf plots. (D) Interpreting data across multiple display types.

End of Alignment Guide. Grade 4. Magma Math IMRA Submission.