

K-5 Learning Math Website Analysis and iOS Application Requirements

Introduction

K-5 Learning's **Math** section provides printable worksheets and workbooks for kindergarten through sixth grade. Each grade page lists core math topics and links to collections of worksheets that practice those skills. The materials are primarily paper-based (PDF worksheets) and focus on numeracy, arithmetic operations, measurement, geometry and foundational algebraic concepts. To build an **iOS app** for iPhone and iPad that delivers similar educational value, we must capture the curriculum structure and redesign the activities for an interactive touch interface. This report summarises the topics and worksheet types for each grade and recommends screen-friendly teaching approaches and resources.

Kindergarten

Topics and materials

- **Numbers & counting** – worksheets introduce number recognition (1–20) and printing exercises, counting objects, skip counting, backwards counting and missing numbers. Activities include tracing numbers and matching numbers to number words.
- **Odd/even and ordinal numbers** – worksheets distinguish odd and even numbers up to 20 and teach ordinal positions (1st, 2nd, 3rd...).
- **Comparing numbers (more/less)** – worksheets ask children to compare groups of objects or numbers to identify greater or lesser values.
- **Simple addition and subtraction** – “Simple Math” worksheets introduce one-digit sums and differences using pictures and number sentences.

Screen-based teaching approaches

- **Interactive number tracing** – use a canvas where children trace numerals with their finger or an Apple Pencil. Provide animated examples, dotted guidelines and auditory feedback.
- **Counting games** – display groups of interactive objects (e.g., fruits, animals). Children tap to count; the app highlights each object and counts aloud. Include skip counting and counting backwards.
- **Odd/even sorting** – present mixed numbers or objects and ask children to drag each into “odd” or “even” baskets.
- **Ordinal numbers** – show a line of items (e.g., race cars) and ask “Which is 3rd?” or “Tap the fifth flower.”
- **Comparisons** – interactive scales where children move objects to compare weight or number; use number lines for greater/less than.

Suggested resources

- Animated numerals, finger tracing surfaces, drag-and-drop objects, simple audio prompts, printable certificate after completion.

Grade 1

Topics and materials

- **Number charts & counting** – worksheets cover number charts, counting objects, skip counting and number sequences.
- **Number patterns** – exercises identify and extend number patterns (object patterns, “what comes next?”, counting by 2s, 5s, etc.) and input-output charts.
- **Comparing numbers** – worksheets use greater/less than and number lines.
- **Base 10 blocks & place value** – worksheets practise tens/ones using base-10 blocks.
- **Addition and subtraction** – one- and two-digit operations with and without pictures; math facts and word problems.
- **Fractions** – simple fractions ($\frac{1}{2}$, $\frac{1}{4}$) with shapes and sets.
- **Measurement** – worksheets on length, mass and capacity using informal units.
- **Counting money & telling time** – identifying coins, adding simple amounts and reading clocks.
- **Geometry** – identifying shapes, symmetry and basic spatial reasoning.
- **Data & graphing / word problems** – bar charts and picture graphs; simple word problems integrating earlier topics.

Screen-based teaching approaches

- **Number charts** – interactive hundreds chart where children tap numbers to highlight patterns; include hide-and-seek games for skip counting.
- **Pattern recognition** – drag shapes or numbers to complete patterns; use audio cues and incremental difficulty.
- **Virtual base-10 blocks** – digital manipulatives representing ones and tens; children drag blocks to compose or decompose numbers.
- **Addition/subtraction** – animated story problems where learners move objects to solve; timed fact practice with instant feedback and progress tracking.
- **Fractions** – show circles or bars divided into parts; allow children to shade fractions, compare fractions and match pictorial fractions to symbols.
- **Time & money** – interactive clock with movable hands and digital readout; coin tray where children drag coins to match amounts.
- **Geometry** – build shapes by connecting dots; identify shapes in pictures.
- **Data and graphs** – collect data through mini-games (e.g., favourite fruits) and help children build bar graphs by dragging bars to appropriate heights.

Suggested resources

- Audio narration for word problems, drag-and-drop base-10 blocks, interactive clock and coin images, digital stickers for rewards.

Grade 2

Topics and materials

- **Skip counting** – worksheets focus on counting by 2s, 3s, 4s, 5s, 10s etc..
- **Place value & rounding** – reading and writing numbers to hundreds/thousands and rounding to the nearest ten or hundred.
- **Addition and subtraction** – multi-digit sums and differences with regrouping.
- **Multiplication (introductory)** – repeated addition and equal groups; times tables up to 5×5 or 10×10 .
- **Fractions** – fractions as parts of a whole and parts of a set; comparing simple fractions.
- **Measurement** – measuring length, weight and capacity with standard units; word problems.
- **Counting money** – adding cents and dollars using coins and bills.
- **Telling time** – reading analog and digital clocks to five-minute intervals.
- **Geometry** – properties of 2D shapes and introduction to area and perimeter.
- **Data & graphing** – bar graphs, pictographs and simple line plots.
- **Word problems** – multi-step problems combining operations.

Screen-based teaching approaches

- **Skip-counting games** – number lines and jump animations; children select the step size and watch the character jump accordingly.
- **Place value manipulatives** – digital base-10 blocks and abacus simulations; rounding games with number lines.
- **Regrouping practice** – interactive addition/subtraction problems where children drag digits into place and see regrouping visually.
- **Multiplication arrays** – create arrays on a grid; highlight repeated addition; timed flashcards for multiplication facts.
- **Fraction visuals** – dynamic fraction bars and circles; allow kids to divide shapes into equal parts and compare sizes.
- **Measurement lab** – virtual rulers and scales; interactive activities like “measure the worm” or “pour water into the right container.”
- **Money & time** – more complex coin combinations; interactive cash register; clocks with minute intervals.
- **Geometry & area** – tile a rectangle to find area; drag shapes to form composite figures.
- **Graphing** – collect data, build bar and line graphs; interactive questions about graphs.

Suggested resources

- Virtual manipulatives library (base-10 blocks, grids, coins), mini-games for skip counting and arrays, progress dashboards for teachers/parents.

Grade 3

Topics and materials

- **Place value & rounding** – numbers to 10 000 and rounding to nearest ten/hundred.
- **Addition and subtraction** – multi-digit operations; some with regrouping.

- **Multiplication and division** – introduction to multiplication tables and division as inverse operation.
- **Order of operations** – simple two-step operations.
- **Roman numerals** – converting between Roman and Arabic numerals.
- **Fractions & decimals** – simple fractions and tenths; converting between fractions and decimals.
- **Measurement** – area/perimeter, mass, capacity, and using calendars and elapsed time.
- **Counting money** – making change and adding bills/coins.
- **Time & calendar** – reading calendars, elapsed time and 24-hour time.
- **Geometry** – classification of shapes, symmetry and introduction to angles.
- **Data & graphing** – bar graphs, line plots and pictographs.
- **Word problems** – multi-step problems across the topics.

Screen-based teaching approaches

- **Place value & rounding games** – digital abacus up to thousands; rounding number lines with drag-to-nearest marker.
- **Multiplication/division drills** – times-table games, interactive arrays and division sharing activities; immediate feedback and adaptive difficulty.
- **Roman numerals converter** – interactive matching of Roman and Arabic numerals; drag numerals to build numbers.
- **Fractions & decimals** – convert between fractions and tenths using interactive grids; shading tasks; decimals on number lines.
- **Area/perimeter exploration** – build shapes on a grid, count squares for area and measure sides for perimeter; measure irregular shapes.
- **Elapsed time** – digital clock manipulator with start and end times; tasks calculating duration.
- **Geometry** – interactive classification game; rotate shapes to find symmetry lines; measure angles with a virtual protractor.
- **Graphing** – create line plots and interpret data; interactive questions about maximum, minimum, range and median.

Suggested resources

- Timed multiplication games, drag-and-drop Roman numerals, fractional grid manipulatives, built-in protractor and compass tools, badges for concept mastery.

Grade 4

Topics and materials

- **Operations** – mastering four operations with multi-digit numbers (including mental multiplication, column multiplication, mental division and long division). Emphasis on order of operations.
- **Place value & rounding** – numbers to millions and rounding to nearest thousand, ten thousand etc.
- **Fractions and decimals** – fraction addition/subtraction, converting fractions to and from decimals, and working with decimals.
- **Factors and prime factors** – factorization and identifying prime numbers (listed in a “Factoring” category).
- **Measurement** – converting between units of measure and computing area and perimeter.
- **Geometry** – classifying triangles and quadrilaterals, measuring angles and identifying lines of symmetry.

- **Roman numerals** – reading and writing Roman numerals up to 1 000.
- **Data & graphing** – bar, line and pie graphs; interpreting data.
- **Word problems** – multi-operation and fraction problems.

Screen-based teaching approaches

- **Long multiplication/division tutors** – guided steps where learners drag digits into partial products or quotient positions. Provide hints and visual cues.
- **Mental math practice** – flash-cards with time limits and dynamic difficulty; mental multiplication via splitting and recombining numbers.
- **Fraction operations** – interactive fraction bars for adding/subtracting fractions with like and unlike denominators; fraction–decimal converter tool.
- **Prime factorization** – interactive factor trees; drag numbers into branches; highlight prime factors.
- **Measurement & unit conversion** – digital rulers; unit converters; tasks requiring conversions (e.g., convert inches to feet).
- **Geometry & angles** – interactive angle measurement with virtual protractor; classification games for triangles/quadrilaterals; tangram puzzles.
- **Data & graphing** – create bar, line and pie charts from given data; interactive multiple-choice questions.

Suggested resources

- Step-by-step long-division modules, fraction bar tool, factor tree generator, unit-conversion activities, interactive protractor and angle measurement tasks, gamified quizzes with leaderboards.

Grade 5

Topics and materials

- **Operations** – advanced place value & rounding, multi-digit addition/subtraction, multiplication/division (including decimals) and order of operations. Introduces integers.
- **Decimals** – adding, subtracting, multiplying and dividing decimals.
- **Fractions** – adding/subtracting fractions, multiplying/dividing fractions, converting fractions, and converting fractions to/from decimals.
- **Factoring and exponents** – prime factorization, factor pairs and exponent rules.
- **Measurement** – converting units of length, weight and volume; computing area, perimeter and volume; understanding scale.
- **Geometry** – measuring angles, classifying polygons and exploring 3-D shapes; introduction to coordinate geometry.
- **Data & graphing** – more sophisticated graphs (line graphs, coordinate plane) and statistics (mean, median, mode).
- **Algebra** – introduction to variables and simple algebraic expressions.
- **Word problems** – more complex multi-step problems mixing operations, fractions, decimals and variables.

Screen-based teaching approaches

- **Decimal operations** – interactive place-value grids showing decimals; children align decimal points and perform operations with drag-and-drop digits.
- **Fraction arithmetic** – digital tools for finding least common denominators; interactive step-by-step fraction multiplication/division with visual models.
- **Factoring & exponents** – prime factor tree builder; interactive exponent rules puzzles (e.g., expand or simplify expressions).
- **Measurement conversions** – conversion tables; drag objects onto scales and measure; tasks requiring conversions between metric and customary units.
- **Coordinate geometry** – coordinate plane on screen; students plot points, draw lines and shapes, and read coordinates; simple transformations (translate, reflect).
- **Data & statistics** – create and interpret line graphs and scatter plots; compute mean/median/mode using interactive datasets.
- **Algebra basics** – one-step equations solved by dragging numbers or operations to isolate variables; simple function tables.

Suggested resources

- Decimal place-value board, fraction operation toolkit, prime factorization interactive, exponent puzzles, coordinate graph plotter, algebra equation solver, built-in statistics calculator and visualisations.

Grade 6

Topics and materials

- **4 operations** – place value and scientific notation, addition and subtraction, multiplication and division with larger integers.
- **Fractions** – adding and subtracting fractions, multiplying/dividing fractions and converting fractions.
- **Decimals & percents** – converting fractions to/from decimals, adding/subtracting decimals, multiplying decimals, dividing decimals and working with percents.
- **Other topics** – measurement (advanced unit conversions), geometry (polygons, circles, surface area and volume), factoring, exponents, proportions, integers and intro to algebra.

Screen-based teaching approaches

- **Scientific notation and large numbers** – interactive slider for powers of ten; tasks writing numbers in scientific notation and vice versa.
- **Fraction/decimal/percent interchange** – circular diagrams and number lines to convert between forms; interactive tasks for percent of a number.
- **Operations with fractions and decimals** – more advanced fraction simplification and decimal operations with multi-digit divisors; step-by-step solving.
- **Integers & negative numbers** – number line that extends into negatives; temperature/hot-cold contexts; addition/subtraction of integers using vertical movement on the line.
- **Proportions** – ratio tables and scale models; adjustable scales for map reading and recipe scaling.
- **Exponents & roots** – interactive exponent rules game; visual models of square and cube roots.

- **Geometry & measurement** – 3-D shape manipulatives; interactive nets; surface area and volume calculators; circle measurement (radius, diameter, circumference) with dynamic diagrams.
- **Data & algebra** – simple linear functions shown on a coordinate plane; solving for unknown variables in proportional relationships; advanced graph interpretation.

Suggested resources

- Powers-of-ten slider, fraction–decimal–percent converter tool, negative number line, ratio and proportion lab, exponent rule puzzles, 3-D geometry explorer and linear function grapher.

Cross-Grade Features for the iOS App

1. **Adaptive learning path** – track each student’s mastery by topic; adjust difficulty and suggest review or enrichment activities. Provide analytics to parents and teachers.
2. **Gamification and rewards** – points, badges, leaderboards and unlockable content encourage continued practice.
3. **Multimodal instruction** – combine text, audio narration, animations and interactive elements to accommodate different learning styles and keep learners engaged.
4. **Offline capability** – download lesson packs for offline use; sync progress when online.
5. **Parental/Teacher dashboard** – monitor usage, assign tasks, track progress and generate reports.
6. **Accessibility** – support VoiceOver, Dynamic Type, high-contrast themes and haptic feedback to ensure an inclusive experience.
7. **Safe learning environment** – content aligned with K-5 curricula, no ads or external links. Offer privacy-compliant account management.
8. **Content authoring tools** – allow teachers to create custom problem sets using built-in manipulatives and question types.

Conclusion

K-5 Learning’s math worksheets cover a comprehensive curriculum from number recognition and counting in kindergarten through advanced topics such as scientific notation, exponents and proportions in sixth grade. Each grade introduces new concepts while reinforcing earlier skills. Translating these paper-based materials into a modern iOS application requires interactive, multimodal content that leverages touch and animation to visualise mathematical ideas. By incorporating digital manipulatives, dynamic visualisations, adaptive practice and gamification, the proposed app can provide an engaging and comprehensive math learning experience aligned with K-5 Learning’s curriculum.
