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Comprehensive Kindergarten & Grade 1 Math Topics (Combined NY State & K5 Learning) with iOS/iPad Implementation Ideas

This document merges the topic coverage of **K5 Learning's** kindergarten and grade 1 math curriculum with the **New York State Next Generation Mathematics Learning Standards** (NY standards). It lists all topics that students are expected to master by the end of each grade and proposes features for implementing each topic in an iOS/iPad app. The goal is to deliver a complete standards-aligned curriculum that is also engaging and accessible.

Kindergarten

Counting & Numerals

Combined topic	Evidence	Suggested iOS/iPad feature
Counting to 100 by ones and tens; counting forward from any number	NY standards require counting to 100 by ones and tens, starting from any number [1].	Provide an interactive hundreds chart where children tap numbers in order. Include voice narration and highlighting to guide skip-counting (2s, 5s, 10s). A "count on" feature allows learners to start from any number and continue.
Writing numerals 0–20	NY standards call for writing numbers 0–20 [2].	Include finger-tracing and Apple Pencil tracing of digits with guided stroke animations. Use haptic feedback on correct strokes and audio reinforcement.
One-to-one correspondence & cardinality	NY standards emphasise connecting counting to cardinality and pairing each object with exactly one number name [3].	Show groups of objects that children drag and count one by one; the last number counted appears as the total. Provide voice prompts ("Now we have three apples").
Ordinal numbers (1st–10th)	NY standards introduce ordinal numbers up to tenth [4].	Create simple races or lining-up activities where children place items into 1st, 2nd, 3rd positions and hear the ordinal words.
Comparing numbers & more/less	K5 teaches comparing numbers using matching and counting strategies [5].	Present two sets of items and ask the child to tap the group with more or fewer objects. Use number rods or number lines to visualise comparisons.

Combined topic	Evidence	Suggested iOS/iPad feature
Odd/even numbers	K5 includes odd and even numbers up to 20 [5].	Provide a sorting game where children drag numbers or objects into “odd” and “even” boxes, with audio cues and confetti for correct answers.
Compose & decompose numbers ≤ 10; number bonds and sums to 10	NY standards require decomposing numbers ≤ 10 into pairs and finding numbers that make 10 [6].	Offer digital number-bond diagrams where children drag objects to fill two parts; the app automatically shows the sum. Include “make 10” puzzles that prompt learners to complete a tens frame.
Compose & decompose numbers 11–19 into ten ones and extras (early place value)	NY standard K.NBT.1 emphasises understanding teen numbers as ten ones plus some further ones [7].	Introduce virtual base-ten blocks: children drag ten blocks and ones to build numbers 11–19. A visual bundling animation helps them see 10 ones forming a ten rod.
Fluent addition & subtraction within 5; addition/subtraction within 10 and 20	NY standards expect fluency within 5 [8], while K5 extends to sums up to 20 [9].	Provide quick-recall games where children answer simple sums or differences within 5 (flashcards with voice and star rewards). For sums up to 20, use number lines and drag-and-drop counters to model problems; include animated stories for context.
Represent addition & subtraction using objects, drawings, sounds, or equations	NY standard K.OA.1 calls for representing operations with objects, drawings and sounds [10].	Let children manipulate objects on screen (e.g., adding apples to a basket) and draw simple representations. Provide a sound mode (claps, drum beats) that plays as they count operations.

Patterns

Combined topic	Evidence	Suggested iOS/iPad feature
Recognize, duplicate, extend and create simple patterns	K5 teaches recognizing and extending patterns [11]; NY standard K.OA.6 adds duplicating and creating patterns [12].	Present pattern strips with shapes or colors. Children drag the correct next piece to extend the pattern, duplicate an entire pattern in a new row, or build their own pattern using a palette of shapes. Include sound patterns (e.g., rhythmic beats) for auditory learners.

Measurement & Classification

Combined topic	Evidence	Suggested iOS/iPad feature
Describe measurable attributes & use comparison vocabulary (big/small, heavy/light, tall/short)	NY standards require describing objects' measurable attributes using appropriate vocabulary [13].	Offer interactive scenes with everyday items (e.g., animals, boxes). Children compare and drag labels like "heavier/lighter", "longer/shorter", "taller/shorter" onto objects. Include voice narration explaining the comparison.
Directly compare two objects & order by length or weight	NY standards call for direct comparison of two objects [14].	Provide side-by-side objects with measurement lines; children swipe to reorder objects by length or drag weights onto a scale. Feedback explains which object has "more" or "less" of an attribute.
Measure lengths using non-standard units and simple rulers	K5 measurement worksheets use non-standard units, scales and rulers [15].	Include a digital ruler and non-standard units (e.g., blocks). Children drag units end-to-end along an object. A built-in counter tallies the number of units.
Classify objects into categories and count	NY standard K.MD.3 emphasises classification and counting categories [16].	Implement a sorting game where children drag objects into labeled bins (e.g., "fruits", "animals"). After sorting, the app counts each category and shows a bar chart.

Money & Coins

Combined topic	Evidence	Suggested iOS/iPad feature
Explore and identify coins (pennies, nickels, dimes, quarters)	NY standard K.MD.4 introduces exploring coins and identifying pennies and dimes [17]; K5 teaches coin recognition and counting [18].	Use realistic coin images. Children tap a coin to hear its name and value; they drag coins into a "piggy bank" and watch the total increase. For exploration, include a matching activity linking coin fronts and backs to names.

Graphing & Data

Combined topic	Evidence	Suggested iOS/iPad feature
Create and interpret bar charts; sort objects and represent data	K5 graphing worksheets involve reading and creating bar charts [19]; NY standard K.MD.3 (classification) lays groundwork for categorising data [16].	Provide drag-and-drop data games: children sort pictures (e.g., colored balls) into columns that form a bar graph. When complete, the app poses questions like "Which column has the most?" and "How many more blue balls than red?"

Geometry & Spatial Reasoning

Combined topic	Evidence	Suggested iOS/iPad feature
Identify 2-D and 3-D shapes; name shapes regardless of orientation or size	NY standards require naming shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, spheres) regardless of orientation [20] . K5 covers tracing, drawing and naming shapes [21] .	Use interactive flashcards showing shapes at different orientations and sizes. Children tap the correct name; if incorrect, the card rotates to show the shape from another angle. Provide shape-tracing exercises and a free-draw canvas with shape recognition feedback.
Describe positions using above/below/ beside/in front of/ behind/next to	NY standard K.G.1 emphasises positional language [22] .	Incorporate mini-scenes (e.g., a playground) where children drag objects to specified positions (“Place the ball **behind** the tree”). The app narrates the positional words as the child drags.
Distinguish between 2-D (“flat”) and 3-D (“solid”) shapes	NY standard K.G.3 differentiates 2-D and 3-D shapes [23] .	Show paired shapes (e.g., circle vs. sphere). Children choose which is “flat” or “solid” and rotate 3-D shapes with multi-touch gestures.
Analyze, compare and sort shapes by attributes (sides, corners, length)	NY standard K.G.4 encourages comparing shapes based on sides and vertices [24] .	Provide a sorting board where children drag shapes into categories (e.g., “3 sides”, “4 sides”). Show attributes like corners, equal sides and right angles visually.
Model objects by building and drawing shapes; compose simple shapes to form larger shapes	NY standards K.G.5–K.G.6 require modeling shapes with materials and composing larger shapes from smaller shapes [25] .	Include virtual “build-a-shape” kits: children connect digital sticks and clay balls (or tangram pieces) to build shapes. A puzzle mode asks them to join shapes (e.g., two triangles making a rectangle). Provide a drawing canvas where shapes snap together.
Match shapes to real-world objects and understand mirror images	K5 worksheets ask children to match shapes to real objects and draw mirror images [21] .	Show photos of everyday objects (e.g., traffic sign, ball) and ask children to select the matching shape. For mirror images, include a vertical line on a grid and let children draw the missing half of a symmetric figure, with immediate visual feedback.

Grade 1

Counting & Numeration

Combined topic	Evidence	Suggested iOS/iPad feature
Count, read and write numbers to 120	NY-1.NBT.1 specifies counting to 120, starting at any number and writing numerals [26].	Expand the hundreds chart to 120; children can tap numbers to hear them. Provide writing practice for numerals 0-120 with finger tracing and number recognition. Include a "count along" feature that starts at user-selected numbers.
Skip-counting and number patterns	K5 covers number patterns [27] and number charts [28].	Offer interactive skip-counting games (e.g., count by 2s or 5s to feed an animated character). Show sequences and ask children to fill in missing numbers or identify pattern rules.
Comparing and ordering two-digit numbers using tens and ones	NY-1.NBT.3 requires comparing two-digit numbers using >, =, < [29]; K5 also covers comparing numbers [30].	Provide an "alligator mouth" game where children slide two-digit numbers into a scale; the alligator opens toward the larger number. Use place-value charts to reinforce tens vs. ones when comparing.

Operations & Equations

Combined topic	Evidence	Suggested iOS/iPad feature
Addition & subtraction within 20 using strategies (counting on, making 10, decomposing, equivalent sums)	NY-1.OA.6 lists strategies to add and subtract within 20 and fluency within 10 [31]. K5 includes mental addition and subtraction to 20 [32] [33].	Provide a dynamic number line where children move tokens and count hops. A "make ten" tool highlights tens frames; children drag counters to fill a frame before adding the remainder. Include a decomposition slider that breaks numbers apart visually.
Solve one-step word problems with unknowns in any position (addition and subtraction)	NY-1.OA.1–1.OA.2 require solving word problems within 20 [34]; K5 offers word problems [35].	Present animated story problems (e.g., a picnic with disappearing apples). Children select the operation and use manipulatives to solve. An equation box allows them to type or drag numbers and a symbol for the unknown.
Add three numbers within 20	NY-1.OA.2 emphasises adding three numbers with sum ≤ 20 [36].	Provide triangular number-bond puzzles where children combine three numbers. Use counters to show different grouping strategies.

Combined topic	Evidence	Suggested iOS/iPad feature
Understand subtraction as an unknown-addend problem	NY-1.OA.4 treats subtraction as finding the missing addend [37].	Incorporate a “missing addend” tool: given a sum and one addend, children drag counters to fill the gap. Visual number lines can illustrate the distance between numbers.
Apply properties of operations (commutative & associative)	NY-1.OA.3 encourages using properties as strategies [38].	Create matching games showing that 3 + 8 = 8 + 3 and grouping three numbers in different orders. Use interactive tiles to rearrange numbers and see that the sum remains constant.
Relate counting to addition and subtraction	NY-1.OA.5 relates counting to operations [39].	Provide a counting-on feature: after entering 5 + 2, the app counts forward from 5 while highlighting the next two numbers. Subtraction uses counting down.
Determine unknown numbers in equations & understand the equal sign	NY-1.OA.7–1.OA.8 emphasise understanding the equal sign and finding unknowns in any position [40].	Use a balancing scale graphic where equations appear on either side. Children drag numbers to balance the equation. Include fill-in-the-blank equations with unknowns in different positions.
Add within 100 (two-digit + one-digit or two-digit + multiple of 10) using place-value strategies	NY-1.NBT.4 calls for adding within 100 and composing tens when necessary [41].	Provide a place-value board with tens rods and ones cubes. Children drag cubes into rods as they add. A vertical workspace shows the written method alongside the manipulative representation.
Mentally find 10 more or 10 less	NY-1.NBT.5 requires mental calculations of 10 more/less [42].	Offer quick-fire questions where children tap “10 more” or “10 less” from a two-digit number. Use number line leaps of ten to illustrate.
Subtract multiples of 10 within 10–90	NY-1.NBT.6 emphasises subtracting tens using place-value strategies [43].	Use base-10 rods; children physically remove tens rods from a group. Connect to a vertical subtraction representation.

Place Value & Base-10 Blocks

Combined topic	Evidence	Suggested iOS/iPad feature
Understand tens and ones; compose and decompose numbers into tens and ones	Both K5 (base-10 blocks) [44] and NY standards require place-value understanding [45].	Provide a place-value playground where children drag ones into tens rods and build numbers. Include a decomposition view that breaks a two-digit number into tens and ones. A bundling animation teaches regrouping.
Compare two-digit numbers based on place value	NY-1.NBT.3 emphasises place-value comparison [29].	Use a visual tens-and-ones board and ask children which number has more tens or ones. Provide interactive >, < and = symbols to select.

Fractions & Partitioning

Combined topic	Evidence	Suggested iOS/iPad feature
Identify and write halves and quarters; partition shapes into 2 and 4 equal shares	NY-1.G.3 requires partitioning circles and rectangles into halves and quarters [46], while K5 introduces simple fractions [47].	Use interactive pizzas or pies; children drag a knife to slice shapes into halves or quarters. They then label each part (1/2 or 1/4). For fractions of sets, show groups of objects and ask children to select half or a quarter.

Measurement, Time & Money

Combined topic	Evidence	Suggested iOS/iPad feature
Order and compare lengths using direct and indirect comparison	NY-1.MD.1 covers ordering three objects by length and comparing using a third object [48]; K5 measurement also orders objects [49].	Provide three rods of different lengths; children drag them to arrange from shortest to longest. For indirect comparison, they compare objects using a measuring stick that cannot be placed directly on both objects.
Measure lengths using iterated units and express measurements in whole units	NY-1.MD.2 emphasises iterating length units [50].	Offer virtual cubes or paper clips. Children place units end-to-end along an object; a counter tallies the length. They then drag the number onto a recording sheet.

Combined topic	Evidence	Suggested iOS/iPad feature
Tell and write time to the hour and half-hour using analog and digital clocks; understand "o'clock" and "half past"	NY-1.MD.3a requires telling time to the hour and half-hour [51]; K5 introduces clock reading [52].	Provide an analog clock with movable hour and minute hands and a digital display. Children set times ("half past five") and watch the hands move. Include routine-based questions ("What time do you eat lunch?") and an elapsed-time slider.
Identify and count coins, including counting mixed collections of dimes and pennies up to 100 cents	NY-1.MD.3b–3c emphasises identifying coins and counting mixed collections [53]; K5 money worksheets count coins [54].	Provide a digital cash register. Children drag coins to make totals (e.g., 34 ¢ using dimes and pennies). A "value meter" shows how the total increases. Include practice writing the cent sign (¢).
Organize, represent and interpret data with up to three categories	NY-1.MD.4 requires interpreting data categories [55]; K5 graphing introduces simple bar charts [56].	Implement a data lab: children sort items into up to three categories and the app displays bar graphs and pictographs. They answer questions like "How many more apples than oranges?" via tappable multiple choice.

Geometry & Spatial Reasoning

Combined topic	Evidence	Suggested iOS/iPad feature
Distinguish defining vs. non-defining attributes of shapes	NY-1.G.1 asks students to recognise defining attributes (e.g., triangles are closed and have three sides) and ignore non-defining attributes [57].	Present shapes of different colors, sizes and orientations. Children select those that satisfy a defining attribute (e.g., "Choose all the triangles"). Provide a feature where they label sides, corners and right angles.
Compose shapes (2-D and 3-D) to create composite shapes	NY-1.G.2 encourages composing shapes into new shapes [58].	Use digital tangram pieces and 3-D blocks. Children drag shapes together to form a target picture (e.g., a house or animal). The app highlights when a composite shape is correct.
Partition shapes into halves and quarters & use fraction vocabulary	NY-1.G.3 covers partitioning and describing shares [46].	Provide partitioning tools on rectangles and circles. Children draw lines to divide shapes and label each section. For each division, the app speaks the fraction ("This is one quarter").

Combined topic	Evidence	Suggested iOS/iPad feature
Identify, draw and transform 2-D and 3-D shapes; mirror images and rotations	K5 geometry includes drawing and rotating shapes and identifying 3-D shapes [59].	Provide a drawing pad with shape templates; children trace shapes and rotate them with pinch gestures. For mirror images, a vertical line splits the screen and children draw the other half; the app checks symmetry.

Word Problems & Mixed Applications

Combined topic	Evidence	Suggested iOS/iPad feature
Solve contextual problems involving addition, subtraction, time, money, measurement and fractions	K5 and NY standards include word problems across domains [35] [34].	Embed math challenges in short stories with characters. Children choose manipulatives (counters, clocks, coins, rulers) to solve. Provide hints and allow multiple solution paths. Encourage children to explain their thinking verbally or via audio recording (captured as part of progress tracking).

Summary

By blending K5 Learning's curriculum with New York's Next Generation standards, this comprehensive list ensures that every kindergarten and grade 1 math concept is covered. Each topic includes a specific suggestion for how to implement it in an iOS or iPad app using interactive, touch-based activities. Features like digital number lines, base-10 blocks, manipulatives, pattern builders, measurement tools, clocks, coins, data labs and tangram puzzles provide concrete learning experiences and align with both curricula. This combined approach allows the app to meet or exceed state standards while maintaining the engaging, child-friendly design advocated in previous planning documents.

[1] [2] [3] [4] [6] [7] [8] [10] [12] [13] [14] [16] [17] [20] [22] [23] [24] [25] New York State Next Generation Mathematics Learning Standards Kindergarten Crosswalk
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[9] Free Preschool & Kindergarten Addition Worksheets - Printable | K5 Learning
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