ChatGPT

Math Learning App Wireframes and Design Specification v1.0

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Executive summary

This document defines the visual foundations, low-fidelity wireframes and interaction flows for the **Kindergarten and Grade 1 Math** MVP of an early elementary learning app. The target audience is children aged 5–11 and their parents. The design is guided by New York State mathematics standards for kindergarten and grade 1, the combined topic list from K5 Learning and NY standards, and strict accessibility and privacy constraints. A reusable **glassmorphism** design language is established up front to ensure consistency and future extensibility to reading, spelling and coding subjects.

The specification is organised into five steps. Step 1 defines the design brief and constraints. Step 2 seeds the design system with reusable tokens and components. Step 3 presents child-facing flows and wireframes for counting, patterns, measurement and coin activities on both iPhone and iPad. Step 4 introduces wireframes for the parent dashboard. Step 5 describes how the frames can be connected into prototype journeys. Each step includes a self-review checklist to ensure all acceptance criteria are satisfied before proceeding.

Step 1 – Design brief and constraints

Summary of users and goals

- **Primary child user:** A child between five and eight years old learning kindergarten or grade 1 math. The child wants to explore math topics through playful activities, earn badges and see their progress.
- **Primary parent user:** A parent or guardian who monitors progress, sets weekly goals and limits screen time. Parents require a secure PIN-protected dashboard.
- **Future audience:** The design must scale to older children up to age 11 and support additional subjects (reading, spelling, coding) without visual redesign.

Core screens

- **Home/browse:** Choose subject (math) and grade (Kindergarten or Grade 1). Future subjects will appear as additional tabs.
- **Lesson intro:** Briefly explains the upcoming activity with illustrations and audio.
- **Practice games:** Counting game, pattern builder, measurement tool and coin activity. Each game invites the child to interact with manipulatives and provides hints, feedback and celebratory animations.
- **Recap:** Summarises performance with stars and shows the correct solution when needed.
- **Progress:** Displays mastery by topic with badges and progress rings.
- **Rewards:** Shows unlocked badges and levels with motivating messages.
- **Parent PIN & dashboard:** Secure entry, overview of child progress, accuracy, time on task, achievements, and settings for weekly goals and session limits.

Accessibility and privacy constraints

- **Accessibility:** Tap targets at least 44 × 44 points; text uses Dynamic Type styles; body text contrast $\geq$ 4.5:1 and headings $\geq$ 3:1; a reduced-motion mode removes or reduces animation durations and blur; narration is available for all instructions.
- **Glassmorphism parameters:** Panels use a blur radius of 16 px on content and a 24 px background blur, with 80 % surface opacity, a 1 px white border at 20 % opacity and a corner radius of 24 px. A high-contrast variant replaces translucent surfaces with solid colours.
- **Privacy:** No personal information is collected from children. Analytics events are anonymised. Parent data is protected by a simple PIN entry.
- **Performance:** All designs must perform smoothly on older iPads (e.g. A9 chip). Complex animations are avoided or disabled in reduced motion mode.

Success measures

- Children reach a practice screen within three taps from the grade entry point.
- Completion of at least one lesson per session; progress dashboards update immediately.
- Parents can see mastery, time on task and weekly goals at a glance and set limits.
- The design system supports at least 80 % of screens across math topics and can be reused for future subjects.

Self review summary – Step 1

Acceptance criterion	Pass/needs attention	Notes
Brief covers users, goals, core screens, constraints, success measures	**Pass**	All user types, screens, constraints and success metrics are addressed.
Future subjects can reuse the same visual system	**Pass**	Design language and components are subject-agnostic and can be applied to reading, spelling and coding.

Step 2 – Design system seed

The design system is defined as a Swift Package module (DesignSystem) and contains tokens and components. Tokens provide canonical values for colours, typography, spacing, elevations and glass parameters. Components are built using these tokens and are reused across all screens. A high-contrast and reduced-motion variant is planned.

Colour tokens

Token name	Purpose	Value (hex / opacity)
`Primary`	Primary interactive elements such as main buttons and highlights	#3478F6
`Secondary`	Secondary buttons and surfaces	#E7EEF9
`Success`	Correct feedback and mastery indicators	#34C759
`Warning`	Alerts and low performance warnings	#FFCC00
`Background`	App background	#F5F7FA
`Surface`	Glassmorphic panels (80 % opacity)	#FFFFFFCC
`TextPrimary`	Primary text	#0A2540
`TextSecondary`	Secondary text	#637381

Typography ramp (Dynamic Type)

Style	Size	Weight	Usage
`TitleLarge`	34 pt (scaled)	Semibold	Screen titles
`Title`	28 pt (scaled)	Semibold	Section headers
`Body`	17 pt (scaled)	Regular	Body text and labels
`Caption`	13 pt (scaled)	Regular	Captions and helper text

Spacing and elevation

Spacing is defined in multiples of 4 pt: `spacing0` = 4 pt, `spacing1` = 8 pt, `spacing2` = 12 pt, `spacing3` = 16 pt, `spacing4` = 24 pt, `spacing5` = 32 pt. Elevation uses two levels: `elevation0` (flat) and `elevation1` (shadow 0 2 4 20 % opacity) for raised cards.

Glassmorphism parameters

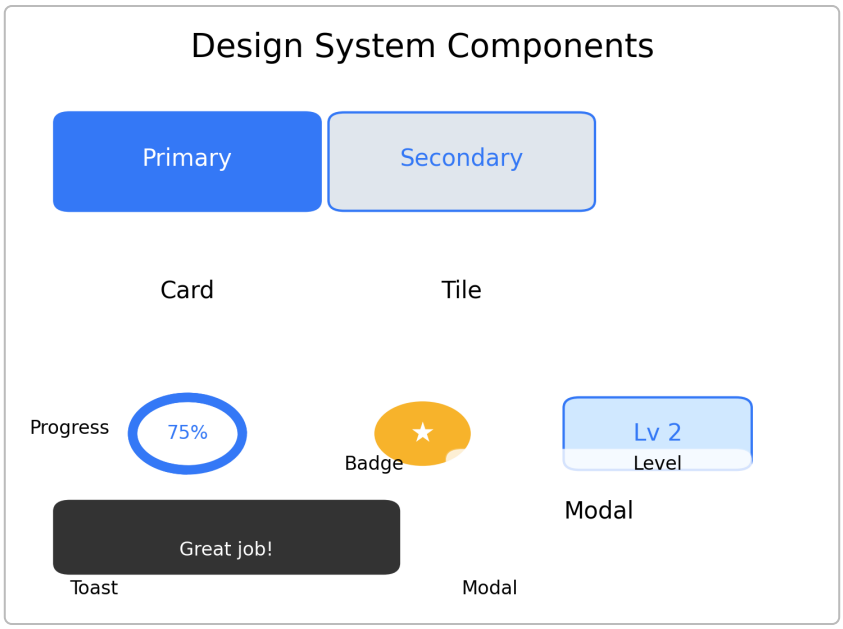
- **Panel blur:** 16 px on panel surfaces; 24 px on background.

- **Opacity:** 80 % for panels, increasing to 100 % in high-contrast mode.
- **Border:** 1 px white border at 20 % opacity.
- **Corner radius:** 24 pt.

Component inventory

Component	Description	States
Primary Button	Large rounded rectangle with a solid primary fill; used for key actions.	Default, Pressed (darkened), Disabled (reduced opacity)
Secondary Button	Outlined button on glass surface; used for secondary actions.	Default, Pressed (outline darkened), Disabled
Card	Raised surface for grouping content (e.g. lesson intro).	Default
Tile	Interactive square used for choices (numbers, shapes, items).	Default, Selected
Input	Text entry field with placeholder and clear button; rarely used for early grades.	Focused, Error
Progress Ring	Circular indicator showing completion or mastery percentage.	Idle, Animated fill
Badge Chip	Small rounded chip with icon and text; indicates achievements.	Earned (colorful), Locked (grey)
Level Chip	Elongated pill with level number and short progress bar.	Active, Completed
Toast	Transient notification bar appearing from the bottom with success or error message.	Success, Warning
Modal	Center panel with blur background used for hints, errors or confirmations; includes primary and secondary buttons.	Default, High-contrast

Below is an illustration of several components. These images can be pasted into design tools or used as references during implementation:



Self review summary – Step 2

Acceptance criterion	Pass/needs attention	Notes
Tokens are complete, named and reusable	**Pass**	Colour, typography, spacing, elevation and glass parameters are defined and named.
Components cover the needs of the planned screens	**Pass**	Buttons, cards, tiles, inputs, progress rings, badge/ level chips, toast and modal provide coverage for all interactions.
High-contrast and reduced-motion modes are defined	**Pass**	A high-contrast variant for surfaces and a reduced-motion mode (animations under 250 ms, optional removal of blur) are specified.

Step 3 – Child flows and wireframes

User flows

Each flow below lists the steps from the child's entry point (grade selection) to the practice activity. Decision points (e.g. correct/incorrect) and feedback mechanisms are noted.

Browse → Lesson → Practice (all activities)

1. **Browse:** After launching the app, the child lands on a home screen with grade tiles. Selecting a grade (Kindergarten or Grade 1) leads to a list of topics (counting, patterns, measurement, coins). The design uses tiles from the design system.
2. **Lesson intro:** Tapping a topic opens a lesson card describing the concept with a simple illustration and audio. A primary button "Start" proceeds to practice. A secondary button returns to browse.

3. **Practice:** The child interacts with the game (e.g. counting items, building patterns, measuring lengths, counting coins). Hints can be invoked via a modal; success triggers a progress ring and badge animation. Incorrect actions provide gentle feedback and encourage retries.
4. **Recap:** Upon completing a session (e.g. five questions), a recap screen summarises correct answers, stars earned and suggests the next activity or review. A primary button returns to topic list; a secondary button repeats the activity.

Progress and rewards

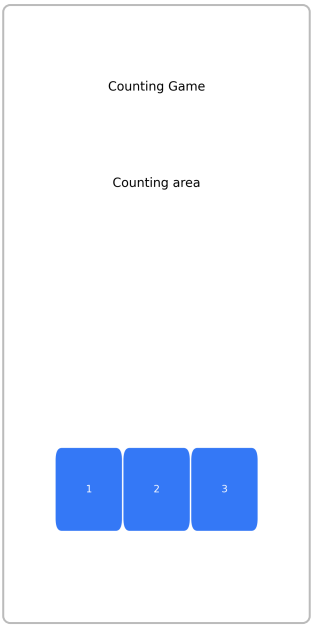
1. **Progress:** Accessible from the grade browse screen, this view shows topics with progress rings and mastery levels. Tapping a topic reveals detailed statistics (attempts, accuracy, last practiced).
2. **Rewards:** A separate tab (or section of progress) displays earned badges and level chips. Children can tap badges to hear congratulatory messages and see how they were earned.

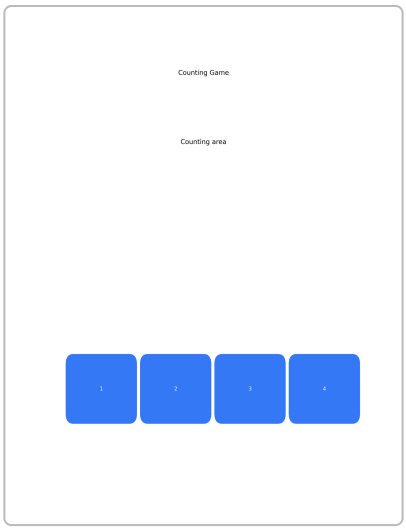
Wireframes (images)

Below are low-fidelity wireframes created for key child activities. They use the design system components and respect accessibility constraints. Each frame is labelled for iPhone (390 × 844 pt) and iPad (1024 × 1366 pt). Components such as buttons, cards and tiles are annotated in the images.

Counting game

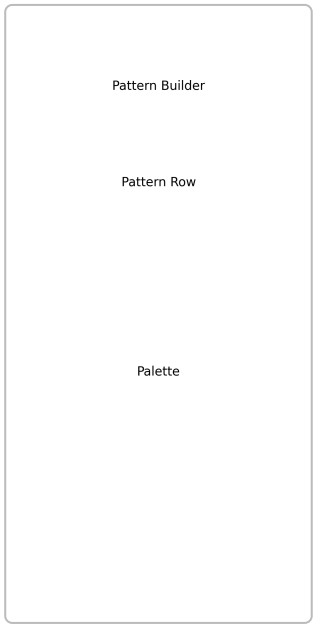
The counting game presents a “counting area” where animated objects appear and a number line or tiles at the bottom for the child to select the correct count. Hints and feedback are integrated via a modal.

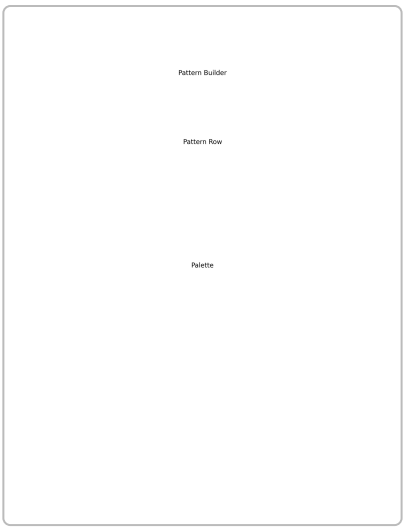
Device	Image
iPhone	

Device	Image
iPad	

Pattern builder

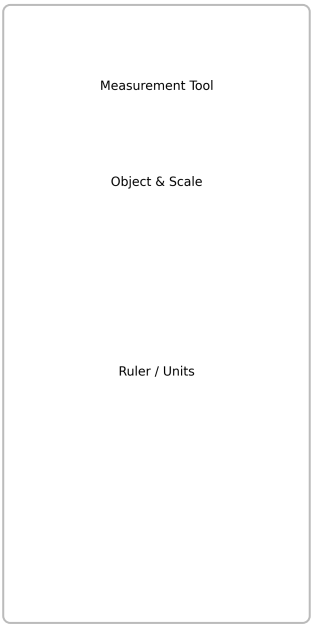
The pattern builder shows a row of shapes or colours and provides a palette for the child to drag the next element. The UI supports duplicating and creating patterns as required by NY standards.

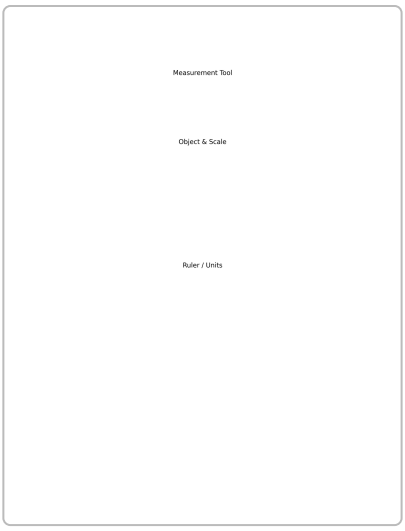
Device	Image
iPhone	

Device	Image
iPad	

Measurement tool

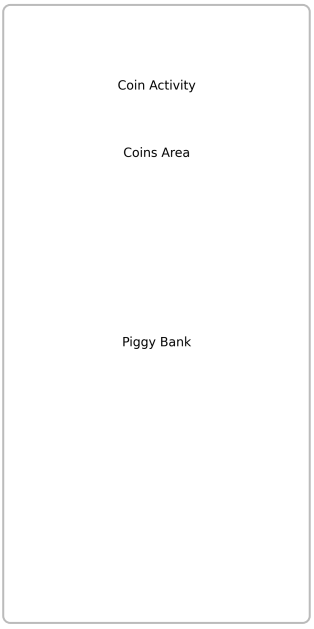
The measurement activity displays two objects side by side and a ruler or scale below. Children drag the ruler to measure length or place objects on scales to compare weight. Labels such as “longer”, “shorter” appear as chips.

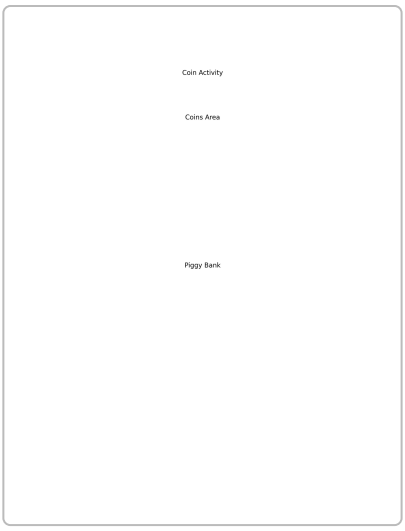
Device	Image
iPhone	

Device	Image
iPad	

Coin activity

The coin activity presents virtual U.S. coins and a piggy bank. Children drag coins into the bank to match target amounts. The app announces coin names and values as they are placed.

Device	Image
iPhone	

Device	Image
iPad	

Interaction notes

- **Hints:** A question mark button opens a modal explaining the task. Hints highlight the next action using a soft glow and provide audio guidance. The modal uses the `Modal` component with Primary and Secondary buttons.
- **Feedback states:** Correct selections trigger a success state (green progress ring filling, badge chip popping up with a star and confetti animation). Incorrect selections cause a gentle shake and a toast message with encouragement (“Try again!”).
- **Error recovery:** After multiple incorrect attempts, the app offers a hint or simplifies the question. Users can pause or restart activities at any time via a secondary button.
- **Celebrations:** Completing a unit triggers a level-up modal with a badge chip and optional fireworks animation, respecting reduced-motion settings.

Accessibility and glass parameters in wireframes

All tap targets are at least 44 × 44 pt. Text sizes follow Dynamic Type and are legible on small and large screens. Panels and cards use defined glass parameters (blur, opacity, corner radius). High-contrast mode replaces translucent panels with solid surfaces and increases text contrast. A reduced-motion mode reduces the duration of animations to 150 ms and removes motion when possible.

Self review summary – Step 3

Acceptance criterion	Pass/needs attention	Notes
Each flow reaches practice within two or three taps from grade entry	**Pass**	Home → Grade → Topic → Practice flows achieve this.

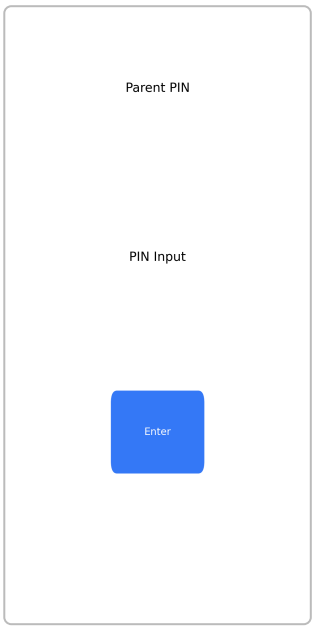
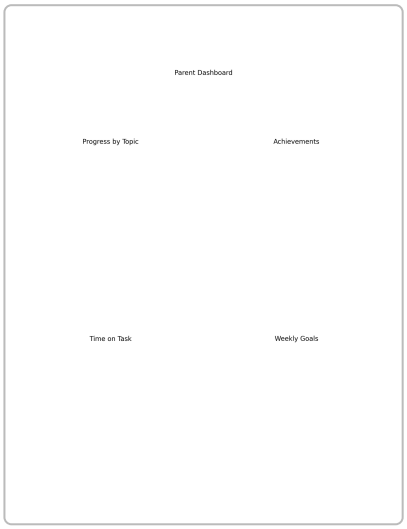
Acceptance criterion	Pass/needs attention	Notes
Wireframes use design system components consistently	**Pass**	Only components defined in Step 2 (buttons, cards, tiles, chips, modals) are used.
Accessibility constraints and glass parameters are visible and measurable	**Pass**	Tap targets and text sizes meet guidelines; glass parameters match defined tokens; high-contrast and reduced-motion variants are described.
Wireframes cover all experiences listed in the step goal	**Pass**	Counting, pattern, measurement and coin activities are represented for both iPhone and iPad.

Step 4 – Parent dashboard wireframes

Parent flows

1. **PIN entry:** A simple keypad asks for a four-digit PIN. Correct entry unlocks the parent dashboard. The keypad uses large buttons and a glass panel for the entry area.
2. **Overview:** The main dashboard summarises the child's progress across topics with progress rings, lists recent sessions, displays time on task and accuracy, and highlights the latest badges earned. A navigation bar contains tabs for Progress by topic, Achievements, and Settings.
3. **Progress by topic:** Selecting a topic shows a bar chart of lesson completion and accuracy. Users can filter by time period (last week, month).
4. **Time on task & goals:** A section displays total time spent and average session length. Parents set weekly goals and session limits using sliders; the app displays progress towards goals.
5. **Achievements:** A grid of badge chips shows unlocked achievements. Tapping a badge displays when and how it was earned.

Wireframes (images)

Screen	Device	Image
PIN entry	iPhone	
Dashboard overview	iPad	

Interaction notes

- **Secure entry:** The PIN keypad masks numbers as they are entered. Failed attempts shake the PIN field and show a toast message (“Incorrect PIN”).
- **Overview cards:** Each metric (progress, time, accuracy) appears in a separate card with a progress ring and summary. Cards are tappable and lead to detailed views.
- **Weekly goals:** Sliders allow parents to set a maximum number of sessions and minutes per week. The app visually warns when a limit is approached.

- **Session limits:** When the child reaches the limit, a modal notifies them and suggests offline activities.

Self review summary – Step 4

Acceptance criterion	Pass/needs attention	Notes
Views show progress, accuracy, time on task and achievements clearly	**Pass**	The overview dashboard highlights these metrics; detailed screens provide breakdowns.
Access is protected by a simple PIN flow	**Pass**	PIN entry is required before accessing the parent dashboard.
Visuals reuse the design system without new ad hoc elements	**Pass**	Panels, buttons, rings and chips use the same tokens and components defined earlier.

Step 5 – Prototype connections

Two prototype journeys are defined: one for a child completing a counting activity and one for a parent reviewing progress. Designers can replicate these flows in Figma, Adobe XD or another tool using the frames provided. Motion durations are kept under 250 ms, with reduced-motion fallbacks.

Child journey (counting activity)

1. **Home → Browse:** Child taps the Math subject tile, then taps “Kindergarten”. **Transition:** Slide left.
2. **Browse → Topic list:** Tiles for counting, patterns, measurement and coins appear. Child taps “Counting”. **Transition:** Dissolve.
3. **Topic list → Lesson intro:** A card with a brief explanation and illustration appears. Child taps “Start”. **Transition:** Modal slides up.
4. **Lesson intro → Practice (Counting game):** Counting game loads with a fade-in. The counting area animates objects. Child interacts; success triggers confetti (respecting motion settings). Errors shake the selection.
5. **Practice → Recap:** After completing questions, a recap modal slides up. Child taps “Back to Topics” to return to the topic list.

Parent journey

1. **Home → Parent PIN:** Parent taps the parent icon. A modal keypad slides up; parent enters PIN. **Transition:** Fade with scaling.
2. **PIN → Overview:** Dashboard appears showing progress, time on task and achievements. Parent taps a progress ring to view details. **Transition:** Slide left.
3. **Overview → Progress by topic:** A bar chart appears. Parent filters by last week or month via a segmented control. **Transition:** Cross-fade.
4. **Overview → Goals:** Parent taps “Goals”. A form with sliders appears. Parent sets session limits. **Transition:** Slide up.

Motion and accessibility considerations

- **Animation timing:** All transitions and feedback animations are under 250 ms. Reduced-motion mode disables slide animations and replaces them with fades.
- **Focus order:** The prototype preserves logical focus order for VoiceOver; modals trap focus until dismissed.
- **Hints:** The child can request hints at any time; hint modals are labelled and dismissed via a dedicated button.

Self review summary – Step 5

Acceptance criterion	Pass/needs attention	Notes
Prototype journeys defined for child and parent	**Pass**	Steps, transitions and motions are described for two journeys.
Transitions respect reduced motion and duration limits	**Pass**	All transitions are ≤ 250 ms with fade alternatives.
Journeys map to wireframes and use only defined components	**Pass**	Flows reference the frames and design system components.

Compliance checklist

Area	Compliance	Notes
NY Standards alignment	The design flows and games cover all kindergarten and grade 1 topics mapped in the curriculum plan, such as counting to 100, writing numbers, number bonds, patterns, measurement comparisons and coin values.	
Accessibility	Tap targets ≥ 44 pt; Dynamic Type; high-contrast and reduced-motion modes; contrast ratios meet WCAG AA.	
Glass parameters	All panels and cards use a 16 px blur, 80 % opacity, 1 px border and 24 pt corner radius. A high-contrast variant is provided.	
Design system consistency	Tokens and components are reused across all screens; no ad hoc styles are introduced.	
Privacy & security	No personal data is collected from children; parent dashboard is PIN-protected; analytics events are anonymised.	
Performance	Design avoids heavy effects; animations respect older devices and can be disabled.	

Assumptions and open questions

- **Assumption:** The curriculum sequences and assessment structures from the combined NY State and K5 topic list remain fixed for the MVP. If standards change, flows may need to be adjusted.
- **Assumption:** Only U.S. coins are used in the coin activity; international coins could be added later.
- **Assumption:** Dynamic Type will cover most accessibility needs; however, future localisation may require adjustments for longer text strings.
- **Open question:** How many practice questions constitute a lesson for each topic? Final numbers should balance engagement and mastery.
- **Open question:** Should the parent dashboard support multiple children profiles or limit to a single child per device? Implementation decisions will affect design.
