

Nell & Key

How the learning loop runs

Prepare a lesson. Check its exact content. Deliver through its publication policy. Keep what the child actually did.



[Play the public missions](#)

<https://www.nellandkey.com/#missions>

Ingredients



Draft



Validation



Publication policy



Frozen record

● SHIPPED CODE

Code is integrated

Daily maths, hobby missions, Studio, review and Book/PDF paths exist in this checkout. Its released base is 24968b33; account setup and production journeys need separate proof.

● SETUP REQUIRED

Know the proof boundary

Central reports main CI green and cloud configuration proof. The new doctor checks a clean clone locally, without environment files or network; it does not certify production readiness. Account permissions, budgets and the guardian journey need separate confirmation.

● PLANNED

Growth stays deliberate

Richer maths factories and animated Book replay remain planned. Reminder sending and provider spend need separate setup. New family entry code does not migrate accounts or opt parents into email.

Guide base: 24968b33. XP rules checked 10 October 2026. Cloud observations retain their own dates; this build makes no new production checks. Public art is illustrative.

Maths and hobbies

Exact content. Explicit delivery policies.

Daily maths



Grade + concept



Checked compiler



Policy assigns



Frozen daily run



Replay + feedback

School grade and starting concept are separate. One local day governs the next run.

● SHIPPED CODE

Code owns the maths

A bounded call writes recipe and story copy. Code validates quantities, worked pictures, hints and answers. Supported models: blocks, equal groups, fraction mosaics and proportional motifs.

● SHIPPED CODE

Keep the exact revision

Revision, content hash and blocking comments still govern publication. Ordinary Studio and hobby drafts retain adult review. Supported automatic maths rechecks replay, current authority and exact narration before assignment.

Completed and started work stays frozen. Changed advice replaces only unassigned future drafts. Completion is not mastery.

Hobby mission



Road + node recipe



Studio draft



Adult publishes



Frozen chapter



Checked finish + ticket

Each assigned road keeps its own cadence. Maths does not replace it or award story XP.

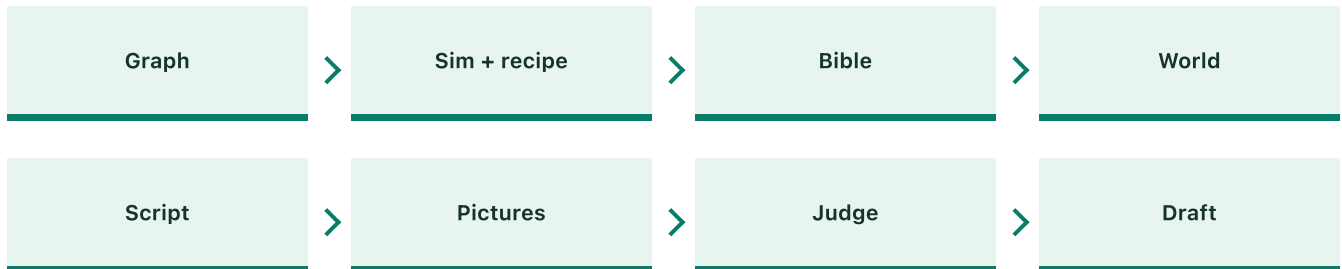
● SETUP REQUIRED

Finish prepares supported practice

Replay queues the next draft. An opt-in local integration seals student feedback, prepares private voice and automatically assigns supported daily maths. It remains default-off; working-level progression and automatic hobbies are still pending.

A recipe before a story

The world must contain what the words name.



● SHIPPED CODE

Node recipe

Freeze the node idea, misconception, grade, existing sub-concepts, prerequisites and question references. Bind the chosen activity's reports and registry contract before story writing.

● SHIPPED CODE

World and script

Resolve place, props, companion and motion before writing shots. Named objects must be buildable. Pictures support the scene; story prose alone cannot create a voxel object.

● PLANNED

Richer maths factory

The quick maths compiler has five checked activity types. Other briefs can open world Studio, which resolves or builds a sim and creates voxel objects around existing recursive concept recipes. Image-to-object extraction and this richer route's daily maths certification are not shipped.

● SHIPPED CODE

Simulation

Reuse an approved activity when it fits. Otherwise the content engine may make a checked, sandboxed candidate. Candidates stay draft-local until separately reviewed and landed in the registry.

● SHIPPED CODE

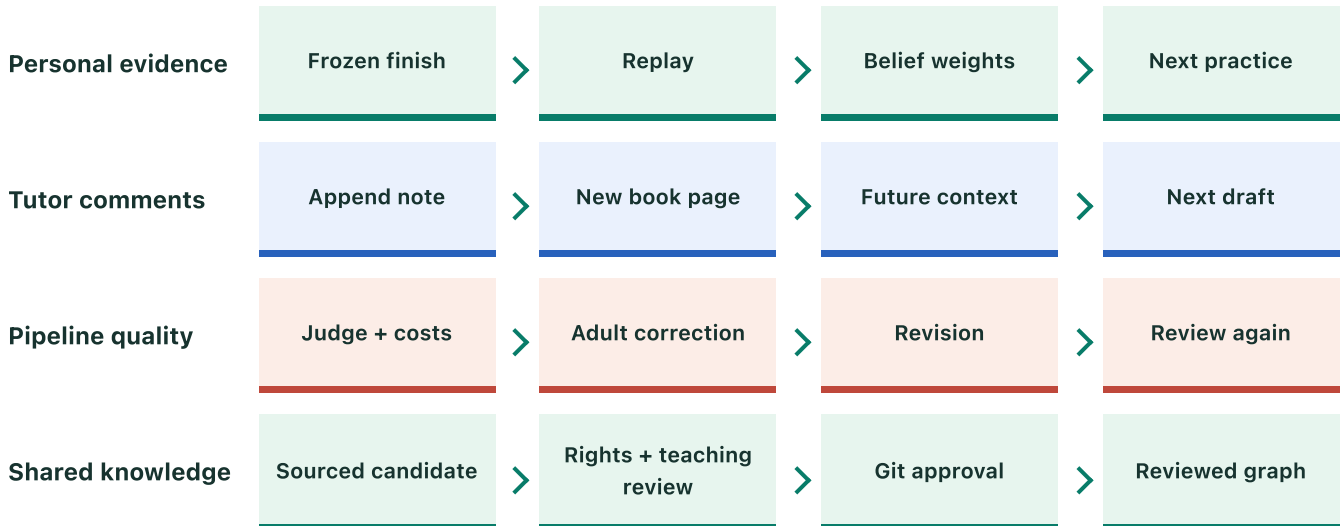
Reuse after publication

The exact published revision can cache an approved packet plus registry contract. Shared recipes are append-only and exclude personal evidence, private graphs and candidates.

New jobs use this order. Older saved jobs and tapes keep their stored order. A missing ingredient holds work; it does not earn automatic approval.

Feedback is not curriculum

Keep personal belief, pipeline quality and graph review distinct.



● SHIPPED CODE

Concept beliefs run in code

The on-demand belief fold reads up to 60 completed chapters and their ledgers. It updates Bayesian weights from a grade prior. This function sends nothing to a model and writes no shared graph.

● SHIPPED CODE

Feedback records the process

Private Studio feedback keeps judge findings, retries, revisions, prompt hashes, timing, cost and an adult correction. It helps repair the pipeline; it is not curriculum approval or a child's mastery certificate.

● SHIPPED CODE

Finish does not wait for advice

Completion queues immediately. A tutor can append dated comments later. Explicit parent-visible notes add Tutor comments pages to the PDF; private class preparation stays private. Future drafts read the separate advice projection. Sent emails and assigned lessons stay unchanged.

● SHIPPED CODE

Code places what it verifies

Code places a nightly maths question only when it works the key out itself and the screen and name guard pass; voxel objects too. Sims land when code clears their fixtures and rights; the rest wait, saying why.

● SHIPPED CODE

Share ingredients, not records

Reusable exports exclude identity and private evidence. Generation uses bounded concept and grade context with guarded adult advice. Child explanations are separate, unscored observations and are not sent to a model.

No automatic graph change from a finish, a tutor note or a model's proposed node. A correct retry is not independent mastery evidence.

Site, records and keepsakes

Public artwork and private learning records have separate homes.

Web

[Vercel / site](#)

Static public pages and browser modules in site/. Public island and mission art stays here.

Records

[Firestore](#)

Private families, chapters, ledgers, daily maths runs, drafts, Studio jobs and feedback. Reads and exports recheck access and erasure.

Curriculum

[Reviewed git assets](#)

Graphs and questions under content/; approved sims under site/primer/sims/; object recipes under packages/primer/src/.

● CLOUD VERIFIED

Cloud service observed

Central's 9 October read-only report: content-engine Ready at revision 00017-5fw, maxScale 1, CPU throttling false. This confirms observed configuration, not unlimited capacity or a child journey.

● CLOUD VERIFIED

Seven-day recovery configured

With the founder's approval, central enabled daily backups retained seven days and seven-day point-in-time recovery. Deletion protection remains on. Configuration was reread; the first backup and a restore drill have not been verified.



[Poster here. Play on the web.](https://www.nellandkey.com/#missions)

<https://www.nellandkey.com/#missions>

API

[Vercel / webhook](#)

Server functions check access, review, runs, queues and publication.

Factory

[Cloud Run + cloud bucket](#)

Content-engine service and nightly moat job. Bucket prefixes: date/run/, node-assets/ and voxel/. Morning pull takes review inputs into git.

PDF

[Protected export or local download](#)

Completed mission and maths exports use frozen records. Daily Book combines verified completions by frozen timezone; earlier saved history has distinct provenance.

● SHIPPED CODE

A PDF is a frozen keepsake

No automatic PDF archive on every finish is established. Protected Book PDFs omit raw answers, speech and private notes. This operations PDF is a public static asset, separate from family exports.

PDFs are static. Public missions may animate on the web. Cloud night artifacts have documented 30-day retention; private record retention is a separate policy.

Schedules and recovery

A scheduled job is a bounded attempt, not a promise of delivery.

Draft writer

`*/5 * * * *`

Every 5 minutes / UTC

Up to three different learners per run, one active lease each. 300 s ceiling, 20 s to store. Stale after 15 min: resumable jobs requeue; uncertain calls hold.

Private demo

`*/2 * * * *`

Every 2 minutes / UTC

Separate authenticated schedule, two bounded steps per run. Activation, verified tester and private namespace required. It never takes a child's queue slot.

Journal scan

`*/15 * * * *`

Every 15 minutes / UTC

Unarmed. If activated: after 08:00 in configured local timezone, up to seven days of catch-up. Reports keep their completion timezone.

Reminder scan

`*/15 * * * *`

17:00 to 18:00 / parent local

Unarmed. Separate guardian opt-in and confirmed timezone. At most one generic sign-in email per guardian/date; three same-window attempts. No missed-day catch-up.

Cloud night

`0 2 * * *`

02:00 / America/Chicago

One task, no retries. New work stops at 2 h 50 min; task ends at 3 h. DST changes UTC time.

Morning pull

`17 11 * * *`

11:17 UTC / daily

Pull each unseen date/run once. An open prior review PR holds the pull; concurrent pulls wait.

● SHIPPED CODE

Recover the exact finish

Hobby finishes commit generation intent atomically. Scans drain eight with frozen evidence checks. Stable tickets deduplicate. Lost Studio jobs resume twice; uncertain calls hold. Daily retries preserve tutor context.

● SETUP REQUIRED

Mail recovery has a limit

Journal sends use stable envelopes and 5 min leases; uncertain replies hold after 23 h. Sending is unarmed. Recipient consent was not inspected.

● CLOUD VERIFIED

Night schedule observed

Central saw ENABLED at 02:00 Chicago. Last attempt: 9 October, 07:00:58 UTC, status {}. Scheduler evidence is not publication proof.

Cloud timing was observed; Vercel timing is configured. Email needs separate consent and activation.

Review, budget, release

Scale the proof and the review capacity with the volume.

\$0.30

Reviewed road ticket default

\$0.60 / 9 min

Engine design default; up to 3 repairs

\$20 / night

Cloud setup default, with lane caps

● SHIPPED CODE

Delivery is not a personal quota

Scheduled maths and hobby writing bypass student and tutor thinking quotas. Platform emergency checks and finite job/retry limits remain. Other chat and voice budgets are unchanged. Accounts shows reported spend, not prepaid balance. A billing credential is configured; a successful provider-cost read is not yet verified.

● SHIPPED CODE

One guardian, child cards

A verified guardian sees only checked child name and grade cards. Choosing one exchanges a server-issued child token; membership, revocation and deletion are rechecked. Adult and child Auth sessions stay separate. Existing child-code sign-in remains a fallback; no records are auto-migrated.

● SETUP REQUIRED

Publication has an explicit boundary

Existing manual lanes use Publish or Assign. The supported daily-maths worker can assign without a tutor click under its opt-in policy. This local integration is not live activation; unsupported mechanisms still require review.

● SETUP REQUIRED

Parallel does not mean unlimited

Three distinct learner leases run independently. The shared provider still has organization/project limits; distributed permits are not shipped. Cloud engine scaling and human review capacity need load proof. Journal defaults: 20 families, 20 pending rows, 5 sends, 240 s and 512 KiB per PDF.

● SETUP REQUIRED

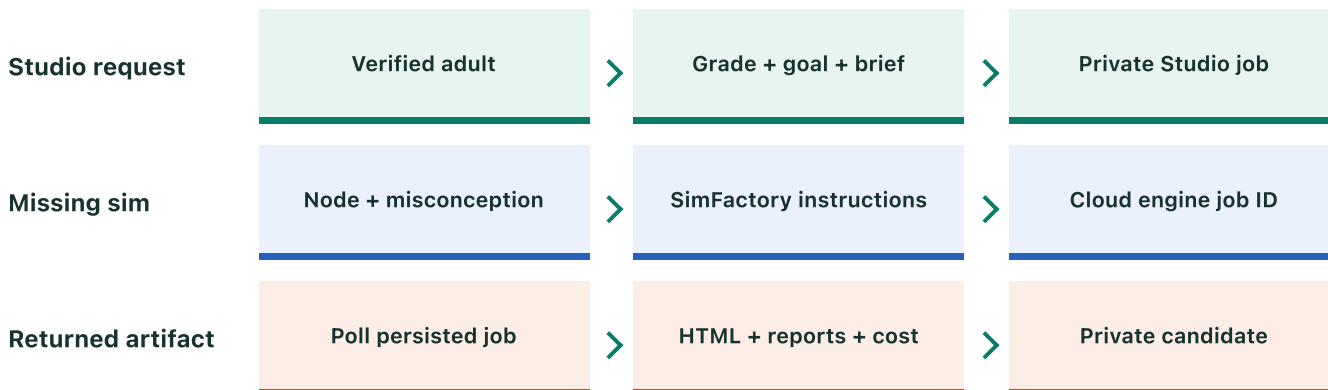
Email needs an opt-in

Reminder code checks guardian consent, timezone and revocation again before sending. Its sign-in link never bypasses authentication. Sending and PDF email remain unarmed; no active SMS or payment rollout is claimed.

Open from the founder desk's Operations guide link. Web and PDF share this manifest. Code proof and cloud configuration do not guarantee every account is set up.

What the factory actually receives

A typed brief, a durable job and a checked artifact.



● SHIPPED CODE

API to engine

The engine receives topic, topic_slug, grade_band, controls, node and mission. The node carries an ID, idea and misconception. The guarded mission includes the adult goal and recipe parts. It is not the family record, child speech or a pasted prompt alone.

● SHIPPED CODE

Model to mission

The author returns a script JSON: sections, sentences, shots and a close. Assembly creates story, check and sim beats. Schema and teaching judges can refuse it. A saved draft is not a published assignment.

● SHIPPED CODE

Engine to Studio

Start returns a job ID. Later reads return running, failed or a finished design. A usable result has HTML, declared report fields, checks and measured cost. A failed design can be repaired within the job's limits; unknown paid outcomes are not blindly repeated.

● SHIPPED CODE

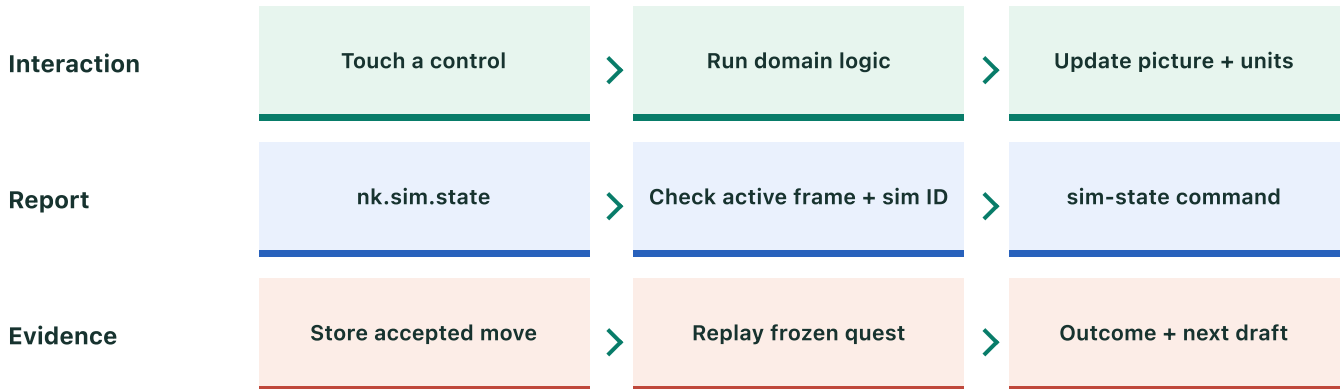
Demo has its own namespace

The test desk stores its missions and replayed runs under the verified tester's lab, not primer_families. Finish commits the result and one successor together. No calendar delay applies. A draft still needs its private validation boundary.

The 16,000-unit engine brief requires a capability handshake. This is structured generation, not an unrestricted instruction to execute arbitrary code.

How a MicroSim becomes evidence

Changing a picture is an observation. Passing a check is a separate claim.



● SHIPPED CODE

Small messages, not a score

The active frame reports nk.sim.state with its simId and values. The player checks the frame identity and active beat. A command carries beatId and the bounded values map. The sim cannot appoint itself as mastered or publish a mission.

● SHIPPED CODE

Server evidence boundary

The saved run binds the quest revision, learner grade and accepted commands. Replaying them rebuilds attempts, hints and sim states. A browser's claimed success or a tutor comment is not independent proof of an outcome.

● SHIPPED CODE

What moves

Approved sims run their own domain logic in a browser frame. A slider may change a graph; a drag may regroup objects. Generated designs declare controls, reports and units. The authored mission says what to observe and checks a fresh case afterwards.

● SHIPPED CODE

Private lab candidates

Generated lab HTML uses an opaque script-only frame and a deny-by-default content policy. It cannot read the parent's authentication or contact the API. Messages still require the active frame and exact sim binding.

A reported value is not a sensor-certified fact. Meaning comes from the reviewed contract and independent checks, not an animation playing to the end.

A knowledge graph, close up

The graph anchors the idea. The story can take it somewhere new.

Concept node

ID + idea + misconception

A small teachable concept, grade scope, checked questions and source references. It is not a floating island or a mastery score.

Edges

Prerequisites and decomposition

Links say which ideas support another and which smaller ideas belong within it. They do not choose the whole creative activity.

Frozen recipe

Fingerprint + mechanism

The job captures actual graph parts, approved questions and sim contract. Bounded traversal rejects broken links and cycles.

Learner evidence

Private replayed records

Attempts, help and finish context remain with that learner. Beliefs are projections, not shared curriculum facts.

● SHIPPED CODE

Keep creative freedom

The recipe anchors the concept and observable evidence. A boat, workshop or street can teach it when supported by the renderer. The quick compiler's bounded vocabulary, blocks and tiles on the stage of one of its checked places, is not a claim of arbitrary world generation.

● SHIPPED CODE

Real sub-concepts

A bounded recursive tree reads existing sub-concepts and prerequisites. It never invents a dependency or inferred learner attainment. Reviewed mechanism reuse must match today's graph fingerprint and registry.

● SHIPPED CODE

Grow with review

New ideas, sources, sims and object provenance are reviewable candidates. Licence scope and teaching checks precede shared approval. Bibliography metadata is not proof that an external lesson was ingested.

● SHIPPED CODE

Comments guide future drafts

Tutor advice is guarded before entering authoring context. The child's records do not become public recipes. Finishing can queue work without a comment; later advice must not silently rewrite an assigned or started mission.

New nodes are not automatic promotions. XP rewards participation, while curriculum progression needs observable evidence and human review.

XP, levels and rewards

Two XP totals. Three reward checkpoints.

Level 5

1,000 XP / A pack of cards, and a sticker of your own dragon

● SHIPPED CODE

Maths XP: 60 per local day

Only a server-replayed maths finish counts. One verified award per family-local date; duplicate or conflicting runs cannot add another. Repeat Finish returns the saved run. This XP is read from verified history, not written into story XP.

● SHIPPED CODE

Levels use total XP

Story XP is the sum of the six stored stats. Where daily maths is ready and a valid companion exists, the desk adds verified maths XP to Intelligence for display only. Level L starts at $50 \times L \times (L - 1)$ XP; level n to n + 1 costs $100 \times n$. Level 1 starts at 0 XP.

● SHIPPED CODE

Reached is not posted

Reached means displayed XP meets the level. Recorded means the prize ID is in the saved companion's earned list; a story award can add it automatically. Neither means dispatched or delivered. Maths display never writes that list. Ask the tutor: choosing, packing and posting physical prizes remain manual.

Level 10

4,500 XP / A mystery pouch, picked for what you have been building

● SHIPPED CODE

Story XP: 60 for an eligible finish

A story finish verified by replay needs at least 3 elapsed minutes measured by the server and offers 60 XP. Later distinct finishes that date offer a quarter, rounded down; all share a 100 XP daily cap. Ordinary quests supply zero moments. Stamina gets a quarter, rounded down; the mission stat gets the rest. Time is elapsed, not proof of active engagement.

● SHIPPED CODE

When the next mission opens

Each road, daily maths included, keeps its own clock: its next mission opens 24 hours after her last verified finish on that road, across midnight and DST alike, never after maths first or more maths XP. First or unfinished readings remain available. Availability still needs an assigned mission; it does not publish a draft.

● SHIPPED CODE

One sitting, one award

An owned chapter and its frozen quest must pass server replay. Completion, XP and its receipt commit atomically once; retries cannot add another award. Reads, previews, the private lab and historical backfill earn nothing. Legacy starter day-done claims return 409 until durable replay evidence exists.

XP recognises participation, not conceptual mastery. A cadence unlock is an access rule, not the knowledge graph's choice of what to teach next. No automatic reward purchase, shipping or delivery tracking is established.