MASTER SPECIFICATIONS

Interactive ICT HTML Simulations

Grades 1–6

Consolidated archival reference for “Σχολικά simulations”

Archive snapshot: 11 September 2026

Coverage: Grade 1 Lesson 1 → Grade 6 Lesson 30

Purpose: preserve the accumulated design, pedagogy, interaction, accessibility, and software-simulation rules for future editions and related books.

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Document control and rule hierarchy

This document is the reusable master specification for the ICT HTML simulation series. It consolidates the rules accumulated while building Grades 1–6, including global rules, grade-specific adaptations, unit identities, lesson-derived corrections, and mature software-simulation conventions.

Field	Value
Document	Master Specifications for Interactive ICT HTML Simulations
Project	Σχολικά simulations
Coverage	Grade 1 Lesson 1 through Grade 6 Lesson 30
Archive date	11 September 2026
Primary use	Future revised editions, derivative books, and comparable ICT simulation projects
Precedence	A later explicit rule overrides an older conflicting rule; narrower grade/unit/lesson rules override broader defaults within their scope.
Language baseline	Greek for the primary-school simulations; Grade 1 Greek-only is strict. Other-language editions require an explicit project-level override.

Rule status key. BINDING = explicit retained project rule. ESTABLISHED = recurring behavior confirmed in delivered/final simulations. LESSON-SPECIFIC = intentionally narrow rule retained for traceability and possible reuse.

Important: “full specifications” means the current consolidated rule set, not a transcript. Superseded behavior is retained only when it helps explain a later rule or prevents regression.

Contents

1. Governance and precedence

These rules control how every other specification in this archive should be interpreted.

Rule ID	Requirement	Scope / status
GOV-001	Treat this document as the master reusable specification for the Grade 1–6 ICT HTML simulation family.	All · BINDING
GOV-002	When two retained rules conflict, apply the later explicit decision. Do not reintroduce an older behavior merely because it appeared in an earlier lesson.	All · BINDING
GOV-003	Within a lesson, precedence is: explicit current lesson instruction → grade/unit-specific rule → global rule → established implementation pattern.	All · BINDING
GOV-004	Preserve lesson-specific exceptions instead of “normalizing” them away when a future edition intentionally reuses that lesson.	All · BINDING
GOV-005	Use the specifications to reproduce interaction concepts and learning intent, not to reproduce the exact code or appearance of a previous HTML file.	All · BINDING
GOV-006	A future improved edition may modernize visuals and code while keeping the pedagogical and interaction contract unchanged unless a rule is deliberately revised.	All · BINDING
GOV-007	Do not infer that an implementation choice from one unit is automatically a global mandate; unit colors, lesson themes, and special activity structures remain scoped.	All · BINDING
GOV-008	Keep terminology stable across books once a project term has been finalized, especially AthenaOS and its application names.	All · BINDING
GOV-009	When using a reference screenshot/page, preserve its educational content and visual language while still implementing the simulation as a sequential interactive experience.	All · BINDING
GOV-010	For archival updates, append a change-log entry and identify which previous rule is superseded rather than silently changing the master document.	Future reuse · ESTABLISHED

2. Pedagogical architecture

The simulation is a guided practice environment whose structure follows the learning objective rather than a fixed game template.

Rule ID	Requirement	Scope / status
PED-001	Design each HTML as a small learning simulation/game, not as a static digital worksheet. The learner must do something meaningful in the interface.	All · BINDING
PED-002	Keep the activity completable within one ordinary 40-minute lesson; practical interaction should comfortably fit the available classroom time.	All · BINDING
PED-003	Break complex skills into manageable stages. Each guided stage should focus on a coherent subskill or decision.	All · BINDING
PED-004	End the lesson with a cumulative “Συνολική δοκιμή” or equivalent integrated task that combines previously practiced actions.	All · BINDING

Rule ID	Requirement	Scope / status
PED-005	Where the book includes self-assessment, include a final “Τι έμαθα;”/self-assessment stage after the cumulative task rather than treating self-assessment as a scored quiz.	Later grades · ESTABLISHED
PED-006	Do not make stage completion depend on a fake “I did it” button. Completion must be derived from the learner’s actual action/state.	All · BINDING
PED-007	Use scaffolding: early stages guide one action at a time; later stages combine actions with less prompting.	All · BINDING
PED-008	Do not unnecessarily repeat the same exact interaction across many stages. Progress should represent increasing competence.	All · BINDING
PED-009	Keep distractors pedagogically plausible but age-appropriate. Avoid trick questions or ambiguity not supported by the source lesson.	All · ESTABLISHED
PED-010	When a real digital skill is being taught, assess the actual digital operation whenever feasible rather than only asking a multiple-choice question about it.	Grades 3–6 · BINDING
PED-011	Use scenarios, characters, or familiar contexts when they reduce abstraction, but do not let story elements obscure the ICT learning objective.	All · ESTABLISHED
PED-012	A cumulative task should require genuine integration of learned actions, not simply replay one guided stage unchanged.	All · BINDING
PED-013	Do not reveal the correct answer after the first error in a way that removes productive retry. Give a useful hint and allow another attempt.	All · ESTABLISHED
PED-014	When several correct selections are required, validation must evaluate the complete required set rather than accept any single correct item.	All · ESTABLISHED
PED-015	Randomize answer order or item order when repetition would otherwise teach position rather than concept, while preserving deterministic learning logic within the current attempt.	As appropriate · ESTABLISHED
PED-016	For multi-part tasks, make progress within the task visible when it helps the learner understand what remains.	Grades 4–6 · ESTABLISHED
PED-017	Avoid arbitrary timers, speed pressure, or punishment mechanics unless time is itself part of the lesson objective.	All · ESTABLISHED
PED-018	Errors must be recoverable without reloading the entire lesson.	All · BINDING
PED-019	The final completion state should summarize accomplishment and provide a clean replay/restart route.	All · ESTABLISHED
PED-020	When a source page contains several exercises, convert them into a sensible stage sequence rather than compressing them into one overloaded screen.	All · BINDING
PED-021	When a lesson source contains fewer meaningful actions, use fewer stages; when it contains more substantial skills, use more. Do not pad activities to hit a fixed count.	Especially Grade 6 · BINDING
PED-022	The learner-facing wording should describe the action to perform, not implementation details of the HTML.	All · BINDING

3. Stage, progress and completion model

The stage system is one of the strongest cross-grade conventions and must remain stable even as the interfaces become more realistic.

Rule ID	Requirement	Scope / status
FLOW-001	Use multiple sequential stages with a visible current-stage indicator.	All · BINDING
FLOW-002	After a successful stage, present positive feedback and automatically load the next stage after a short readable delay.	All · BINDING
FLOW-003	Do not require a separate “Επόμενο/Next” button for normal stage-to-stage progression.	All · BINDING
FLOW-004	A “Next” control is allowed only when it represents an authentic operation inside the simulated software/content, not generic lesson navigation.	All · BINDING
FLOW-005	Progress numbers must be centered within their markers and remain legible at different viewport sizes.	All · BINDING
FLOW-006	Distinguish current, completed, and not-yet-completed stages visually; do not rely on color alone when the distinction carries instructional meaning.	All · BINDING
FLOW-007	Progress must be calculated from completed activities, not from clicks on the progress markers.	All · ESTABLISHED
FLOW-008	Do not allow progress markers to skip mandatory stages unless a lesson explicitly requires free navigation.	All · ESTABLISHED
FLOW-009	When a stage contains several substeps, keep the stage active until all required substeps have genuinely been completed.	All · BINDING
FLOW-010	During automatic transition, lock or guard the stage so repeated clicks cannot advance twice.	All · ESTABLISHED
FLOW-011	Clear stage-specific transient handlers/timers when rendering a new stage to prevent actions from the previous stage affecting the new one.	Grades 4–6 · ESTABLISHED
FLOW-012	Scroll or position the view so the start of a newly loaded stage is immediately understandable, especially on smaller screens.	Grades 4–6 · ESTABLISHED
FLOW-013	Use a concise stage title plus one primary instruction; place detailed procedure in Help or an authentic task strip when needed.	All · BINDING
FLOW-014	Do not duplicate the same stage title/instruction in multiple large areas of the screen.	All · BINDING
FLOW-015	The final cumulative stage must not be automatically marked complete merely because previous guided stages are complete.	All · BINDING
FLOW-016	A lesson may include an explicit final completion screen after the final/self-assessment stage.	All · ESTABLISHED
FLOW-017	Replay/restart from the completion screen must restore the true lesson start state.	All · BINDING
FLOW-018	If subquestions are shown one by one, advance automatically within the stage after each correct response and preserve the stage-level progression model.	As appropriate · ESTABLISHED
FLOW-019	When answer order is shuffled, avoid reshuffling during every re-render of the same subquestion; preserve stable positions until the learner moves on.	Grades 5–6 · ESTABLISHED

Rule ID	Requirement	Scope / status
FLOW-020	Use a progress percentage only when it is meaningful and computed consistently with stage completion.	Later grades · ESTABLISHED
FLOW-021	The current stage must remain distinguishable even when the progress percentage is still based only on completed stages.	Later grades · ESTABLISHED
FLOW-022	Do not add unnecessary confirmation screens between successful action and the next learning task.	All · BINDING
FLOW-023	Final self-assessment choices are not “correct/incorrect”; completion is based on making the required reflection selection(s).	Later grades · BINDING
FLOW-024	For self-assessment tables with multiple objectives, require one selection per objective before completion.	Grades 4–6 · ESTABLISHED
FLOW-025	The number of stages is a design decision derived from lesson content, not a book-wide constant.	All; explicit in G6 · BINDING

4. Feedback, Help, reset and recovery

Feedback is immediate and recoverable; Help is consistent; reset is a real state reset, not a cosmetic repaint.

Rule ID	Requirement	Scope / status
FHR-001	Provide a visible “Βοήθεια” control on every stage unless the stage shell itself already includes the identical persistent Help control.	All · BINDING
FHR-002	Grade 1 Help must reuse the Lesson 1 icon/design/structure and popup pattern consistently.	Grade 1 · BINDING
FHR-003	Help content must be context-sensitive to the current stage.	All · BINDING
FHR-004	Help should explain the next useful idea/action without simply giving away the complete solution.	All · BINDING
FHR-005	In early-grade simulations, offer the established audio/speech option where the Help pattern includes it.	Early grades · ESTABLISHED
FHR-006	Correct action feedback must be positive, short, and followed by automatic progression when the stage is complete.	All · BINDING
FHR-007	Incorrect action feedback must be specific enough to guide retry but should not expose the answer by default.	All · BINDING
FHR-008	Do not punish an error by erasing unrelated correct work.	All · BINDING
FHR-009	For multi-selection tasks, allow the learner to change selections before pressing “Ελεγχος” or the equivalent validation action.	All · ESTABLISHED
FHR-010	For direct-manipulation tasks that can be validated immediately, do not add an unnecessary “Check” button.	All · ESTABLISHED
FHR-011	When “Ελεγχος” is needed, use it only to validate a meaningful assembled state/set, not as a universal stage-ending button.	All · BINDING

Rule ID	Requirement	Scope / status
FHR-012	The reset control must reset all relevant internal state, visual state, counters, selection, and animation state for its scope.	All · BINDING
FHR-013	In movement tasks, reset must also return the avatar/animal/robot to its exact starting position and orientation.	Movement tasks · BINDING
FHR-014	When a selected item is clicked again, selection normally toggles off; reset must also clear all selections.	Selection tasks · BINDING
FHR-015	A wrong temporary matching line disappears on release; correct matching lines remain visible.	Matching tasks · BINDING
FHR-016	Feedback should be announced/accessibly exposed where practical (for example via an aria-live region) rather than only conveyed visually.	All · ESTABLISHED
FHR-017	Do not use confetti or celebration after every trivial step. Reserve stronger celebration for meaningful completion.	All · ESTABLISHED
FHR-018	After final completion, provide a clear replay/restart option rather than leaving the learner in a dead-end state.	All · ESTABLISHED
FHR-019	If a control is unavailable until prerequisites are complete, make it visibly disabled instead of silently ignoring the learner.	Grades 3–6 · ESTABLISHED
FHR-020	When a stage has an internal sequence, feedback should identify the next required action rather than forcing the learner to infer hidden state.	Grades 4–6 · ESTABLISHED

5. Interaction grammar

Across the project, interaction progressively moved from simple tile selection toward authentic mouse, keyboard, menu, file, and editor behavior.

Rule ID	Requirement	Scope / status
INT-001	Use familiar pointer behavior: single click selects, double-click opens/launches where that is the authentic desktop/file/software convention.	Software-like tasks · BINDING
INT-002	When teaching right-click, require an actual right-click/context-menu event rather than a left-click substitute.	Software-like tasks · BINDING
INT-003	When teaching drag, require pointer-down/hold/move/release behavior and provide a visible dragged state or ghost when useful.	Drag tasks · BINDING
INT-004	When teaching keyboard shortcuts, listen for the actual keys rather than presenting shortcut-named buttons.	Grades 4–6 · BINDING
INT-005	Use actual Ctrl+A for select all when that operation is the learning objective.	Text editing · ESTABLISHED
INT-006	Use actual Ctrl+C and Ctrl+V when shortcut-based copy/paste is the learning objective.	Text/browser tasks · ESTABLISHED
INT-007	Use actual F5, arrow keys, and Esc for presentation playback when those are the target controls.	Presentation tasks · ESTABLISHED

Rule ID	Requirement	Scope / status
INT-008	When a learner selects an on-canvas object, immediately show a clear selection/bounding frame.	Object-based editors · BINDING
INT-009	Keep the selection frame visible while that object is the current selection; remove it when selection changes or is cleared.	Object-based editors · BINDING
INT-010	Show handles on the selection frame when resizing/rotation or professional object-state feedback is relevant.	Object-based editors · BINDING
INT-011	Do not rely on border color alone to communicate selection; add a handle, check mark, label, fill/state change, or equivalent secondary cue where practical.	All selection tasks · BINDING
INT-012	For multi-select tiles, clicking a selected tile toggles it off.	Selection tasks · BINDING
INT-013	For single-select tiles, a second click on the same selected tile may clear the selection unless the authentic software behavior requires persistent selection.	Selection tasks · BINDING
INT-014	Use cursor/hover changes only as supplemental cues; the action must remain understandable without hover.	All · ESTABLISHED
INT-015	For list reordering, use actual drag to the intended position rather than “move up/down” substitute buttons when dragging is being taught.	Grades 4–6 · ESTABLISHED
INT-016	For text selection tasks, require the requested selection scope (word, phrase, paragraph, whole text) before accepting the formatting command.	Text editing · BINDING
INT-017	Prevent a formatting tool from stealing the browser selection before validation when selection is part of the task.	Text editing · ESTABLISHED
INT-018	When a learner must type rather than paste, prevent paste/drop/context-menu bypasses for that specific field.	Typing assessment · ESTABLISHED
INT-019	When exact text is required, compare the entered text exactly; do not silently lowercase or normalize capitalization.	Grade 2+ exact typing · BINDING
INT-020	When a task requires adding new text after an existing line/paragraph, the learner must press the real Enter key first and then type on the new line.	Word-processing tasks · BINDING
INT-021	Do not instruct learners to append the text at the end of an existing line and then press Enter if the target concept is creating a new line first.	Word-processing tasks · BINDING
INT-022	If Tab is the authentic operation for moving to the next table cell, require the real Tab key.	Grades 5–6 tables · ESTABLISHED
INT-023	When a file/folder item is selected, visually mark selection before double-click/open.	File manager · ESTABLISHED
INT-024	When a dialog requires choosing a file, keep “Open/Insert” disabled until a valid file is selected.	File dialogs · ESTABLISHED
INT-025	Context menus should appear near the interaction point and disappear when the learner clicks elsewhere.	Software-like tasks · ESTABLISHED
INT-026	Menus/dropdowns should stay open only while relevant and close when the user clicks outside.	Software-like tasks · ESTABLISHED
INT-027	Use real disabled states for commands that should not be available.	All · ESTABLISHED

Rule ID	Requirement	Scope / status
INT-028	Do not accept a wrong action merely because the learner eventually clicks the correct control; validate prerequisite state and action order when order is the target skill.	All · BINDING
INT-029	When a simulated application includes tabs between apps/documents, the active tab must clearly correspond to the visible workspace.	Grades 4–6 · ESTABLISHED
INT-030	Keyboard focus should remain on the logical target after state re-render when the learner is expected to continue typing.	Grades 4–6 · ESTABLISHED
INT-031	Do not make a native-like workflow “magic”: opening, saving, inserting, copying, or launching should follow the path being taught.	Software-like tasks · BINDING
INT-032	When an authentic control is present only for realism but not part of the current learning task, it may be disabled or neutral rather than falsely functional.	Grades 3–6 · ESTABLISHED
INT-033	If multiple methods are being taught (menu route and keyboard shortcut), model each method as a separate genuine interaction rather than treating them as labels for the same fake action.	Grades 4–6 · BINDING
INT-034	Use the actual mouse wheel/scroll behavior where scrolling is the learning objective.	Mouse/GUI tasks · BINDING
INT-035	When an activity is explicitly about selecting only one wrong command and replacing it, do not enable unrelated erase/delete actions.	G1 L3 · LESSON-SPECIFIC

6. Accessibility, language and reading level

Accessibility is built into the interaction design, not added as a final cosmetic pass.

Rule ID	Requirement	Scope / status
A11Y-001	Never rely on color alone for instructions, selection, correctness, categories, or target identification.	All · BINDING
A11Y-002	Pair color with at least one additional cue such as shape, symbol, label, position, border pattern, check mark, or icon.	All · BINDING
A11Y-003	Use sufficiently large click/touch targets for primary-school learners and interactive boards.	All · BINDING
A11Y-004	Keep body text and instructions legible without zoom on typical school laptop displays.	All · BINDING
A11Y-005	Use strong text/background contrast; do not place essential text over visually busy scenery.	All · BINDING
A11Y-006	Do not use “left/right color” as the only way to identify an answer; include a label, symbol, object, or position cue.	All · BINDING
A11Y-007	Progress markers must include readable numbers, not color only.	All · BINDING
A11Y-008	When custom graphics have semantic meaning, provide a text/ARIA equivalent where practical.	All · ESTABLISHED
A11Y-009	Help and feedback should be keyboard reachable and usable without precision pointing.	All · ESTABLISHED

Rule ID	Requirement	Scope / status
A11Y-010	Use visible focus styling for keyboard-operable controls.	Grades 3–6 · ESTABLISHED
A11Y-011	Avoid tiny drag handles or connection points; make interaction targets forgiving while preserving authentic behavior.	All · BINDING
A11Y-012	Keep instructions concise and action-oriented. Avoid dense paragraph instructions when a short prompt plus Help is sufficient.	All · BINDING
A11Y-013	Grade 1 early-year activities must use very little text and must not assume fluent reading.	Grade 1 · BINDING
A11Y-014	For Grade 1 early-year tasks, prioritize icons, shapes, positions, familiar objects, and short labels over text-heavy choices.	Grade 1 · BINDING
A11Y-015	Grade 1 later lessons may contain more text when taught later in the year, but language remains age-appropriate and visually supported.	G1 L13–18 · BINDING
A11Y-016	Grade 1 Lessons 19–22 are treated as beginning-of-year material despite their lesson numbers, so return to minimal-text design.	G1 L19–22 · BINDING
A11Y-017	Do not make Grade 1 learners type unrestricted text early in the year when they may not yet know all letters.	Grade 1 early year · BINDING
A11Y-018	Where reading demand is higher in later grades, keep sentence structure direct and vocabulary aligned with the source book.	Grades 3–6 · BINDING
A11Y-019	Avoid unnecessary reliance on sensory verbs such as “look/see/hear” when an instruction can name the concrete action/content instead.	Project language · ESTABLISHED
A11Y-020	Do not make audio the only way to obtain essential instructions.	All · BINDING
A11Y-021	For draw-line matching on narrow screens, adapt layout responsibly; do not leave unusably tiny connection geometry.	Responsive matching · ESTABLISHED
A11Y-022	Do not clip answer labels, icons, dropdowns, or draggable elements at common viewport sizes.	All · BINDING
A11Y-023	Maintain equal square grid cells in movement tasks; distorted cells can misrepresent distance/direction.	Movement tasks · BINDING
A11Y-024	Do not communicate success only through motion/animation; retain visible/textual confirmation.	All · ESTABLISHED
A11Y-025	Self-assessment labels must be complete enough to understand independently of color or icon.	Later grades · ESTABLISHED

7. Visual and responsive UI system

The visual language evolves with age while remaining coherent, accessible, and intentionally platform-neutral.

Rule ID	Requirement	Scope / status

Rule ID	Requirement	Scope / status
UI-001	Keep all simulations recognizably part of one product family while allowing each unit/lesson its own book-derived visual identity.	All · BINDING
UI-002	Do not clone Windows, macOS, Ubuntu, Microsoft Office, LibreOffice, Scratch, mBlock, or another commercial interface pixel-for-pixel.	All · BINDING
UI-003	Reproduce shared GUI concepts—windows, menus, toolbars, file dialogs, selection, tabs, panels—using a platform-neutral fictional design.	All · BINDING
UI-004	Use AthenaOS where an operating-system environment is pedagogically needed; omit it where the lesson does not involve OS/app interaction.	All · BINDING
UI-005	When a reference image is supplied, reproduce its visual language—characters, spacing, header treatment, colors, progress style, cues—without sacrificing interactivity.	Reference-based tasks · BINDING
UI-006	If multiple reference images belong to successive parts of a lesson, use them sequentially rather than merging all content into one composite screen.	Reference-based tasks · BINDING
UI-007	Do not add an unrelated decorative theme that competes with the book's lesson content.	All · BINDING
UI-008	Primary instruction, workspace, feedback, and Help should have clearly separated visual roles.	All · ESTABLISHED
UI-009	Avoid excessive cards, gradients, shadows, and badges when they do not clarify structure. Later grades should become visually more restrained.	Grades 3–6 · BINDING
UI-010	Use rounded, friendly surfaces more strongly in early grades; gradually move toward real software proportions and density in upper primary grades.	Grade progression · BINDING
UI-011	Ensure unit color identity appears in progress/completion accents and relevant UI highlights, but do not let color override accessibility.	Unit-specific · BINDING
UI-012	Use a consistent success color and error color within each simulation, with text/symbol reinforcement.	All · ESTABLISHED
UI-013	Keep major buttons consistent in shape, padding, typography, and semantic role within a lesson.	All · ESTABLISHED
UI-014	Disabled controls must look disabled; selected controls must look selected; current progress must look current.	All · BINDING
UI-015	On-canvas object selection in presentation/object editors must look like professional software: frame plus handles/selection cue.	Grade 5+ · BINDING
UI-016	For software simulations, use recognizable menubars/toolbars/status bars/panes but retain AthenaOS-family styling rather than vendor branding.	Grades 3–6 · BINDING
UI-017	File/folder graphics should be consistent across Domi/file-dialog views.	Grades 3–6 · ESTABLISHED
UI-018	Use responsive containers and flexible grids so the lesson remains usable on common laptops and smaller tablets.	All · BINDING
UI-019	Avoid horizontal scrolling for the main lesson shell. A complex authentic workspace may scroll internally when necessary.	All · ESTABLISHED

Rule ID	Requirement	Scope / status
UI-020	Do not resize the movement grid when the learner revisits a stage; its tile geometry must remain stable.	Movement tasks · BINDING
UI-021	Use equal square movement-grid tiles across relevant stages within the same lesson.	Movement tasks · BINDING
UI-022	When the book provides a specific unit swatch, treat that swatch as authoritative.	Unit-specific · BINDING
UI-023	Do not use trademarked logos or exact branded application icons unless the curriculum explicitly requires identifying the real platform and the user has asked for it.	All · BINDING
UI-024	For generic software concepts, use custom vector/CSS/HTML assets or neutral symbols.	All · ESTABLISHED
UI-025	Do not generate new illustrative images for the simulation unless explicitly requested; prefer HTML/CSS/SVG and supplied reference assets.	Grade 1 baseline; preferred cross-grade · BINDING
UI-026	If the user supplies approved imagery, preserve the agreed composition/style rather than silently replacing it with a different aesthetic.	Reference-based tasks · BINDING
UI-027	A mature Grade 6 simulation may use larger workspaces, side panels, authentic forms/tables, and denser information than Grade 1–2, but must remain readable.	Grade 6 · BINDING
UI-028	Do not merely copy the Grade 5 shell for Grade 6; redesign the composition and interaction treatment so it feels older and more realistic.	Grade 6 · BINDING

8. AthenaOS and canonical virtual applications

AthenaOS is the neutral software ecosystem that lets the books teach transferable GUI concepts without becoming dependent on a specific commercial platform.

Rule ID	Requirement	Scope / status
AOS-001	The fictional operating system is named “AthenaOS”. Use this spelling consistently.	All AthenaOS tasks · BINDING
AOS-002	AthenaOS represents common modern GUI operating-system concepts; it is not a clone of any one OS.	All AthenaOS tasks · BINDING
AOS-003	Use a friendly owl-head identity associated with Athena/wisdom, primarily in purple/indigo with a warm golden/yellow beak and integrated A/A motif when space permits.	Brand · BINDING
AOS-004	Provide a simplified small owl icon for taskbars, title bars, docks, and app-family contexts where the full wordmark is too large.	Brand · BINDING
AOS-005	Use the owl-head + AthenaOS wordmark together in prominent branding areas when space permits.	Brand · BINDING
AOS-006	Keep AthenaOS child-friendly in lower grades and progressively more realistic in later grades.	Grade progression · BINDING
AOS-007	Typical AthenaOS desktop concepts may include app icons, selection state, windows, title bars, window controls, a top/status bar, and system indicators.	Grades 2–6 · ESTABLISHED

Rule ID	Requirement	Scope / status
AOS-008	Single click selects a desktop application; double click opens it when the lesson is modeling conventional desktop behavior.	Grades 3–6 · BINDING
AOS-009	The word-processing/text-editing application is “Graphis”.	Canonical app name · BINDING
AOS-010	The drawing/paint application is “Chroma”.	Canonical app name · BINDING
AOS-011	The spreadsheet/data application is “Praxis”.	Canonical app name · BINDING
AOS-012	The virtual browser is “Ploigos”. This replaces the earlier trial name “Pytheas”.	Canonical app name · BINDING
AOS-013	The concept/mind-mapping application is “Ennoia”.	Canonical app name · BINDING
AOS-014	The programming-environment family is “Noesis”.	Canonical app name · BINDING
AOS-015	Use the mode labels “Noesis icons”, “Noesis blocks”, and “Noesis code” for icon-, block-, and code-based programming representations.	Noesis · BINDING
AOS-016	Do not revive the rejected programming-app trial name “Entole”.	Naming · BINDING
AOS-017	“Domi” is an implemented AthenaOS file-manager/file-dialog identity used in delivered simulations; retain it when reusing that workflow unless a later naming decision supersedes it.	Auxiliary app · ESTABLISHED
AOS-018	“Provoli” appears as an implemented presentation/viewer identity in delivered Grade 4 workflows; treat it as an established auxiliary name rather than one of the six core canonical app names.	Auxiliary app · ESTABLISHED
AOS-019	Application icons should share a coherent AthenaOS visual language rather than imitate vendor app icons.	All apps · BINDING
AOS-020	Graphis should resemble a credible word processor with menus, toolbars, paper/document area, formatting tools, and file dialogs appropriate to the grade.	Graphis · BINDING
AOS-021	Chroma should resemble a credible child-appropriate paint/drawing program without copying a branded paint application.	Chroma · BINDING
AOS-022	Praxis should resemble a credible spreadsheet with cells, tables, formulas/operations, filters/charts as required by the lesson.	Praxis · BINDING
AOS-023	Ploigos should resemble a credible browser with navigation/address concepts when those concepts are pedagogically relevant.	Ploigos · BINDING
AOS-024	Ennoia should use a clear concept-map visual language consistent with the AthenaOS family.	Ennoia · BINDING
AOS-025	Noesis interfaces should be age-appropriate while preserving the same underlying programming concepts across icons/blocks/code.	Noesis · BINDING
AOS-026	Do not force AthenaOS branding into lessons where the operating system is not part of the content.	All · BINDING

Rule ID	Requirement	Scope / status
AOS-027	Later-grade AthenaOS windows may include authentic details such as title bars, menus, tabs, status bars, Wi-Fi/speaker/time cues, but these remain neutral fictional UI elements.	Grades 4–6 · ESTABLISHED

9. Realistic software and file-workflow simulation

From Grade 4 onward especially, simulations should teach transferable procedural fluency by behaving enough like real software to make the learned action meaningful.

Rule ID	Requirement	Scope / status
REAL-001	Whenever the target skill is software operation, model the operation itself instead of reducing it to a verbal quiz.	Grades 3–6 · BINDING
REAL-002	Opening an app in a desktop simulation should use selection + double-click when conventional desktop behavior is being taught.	Grades 3–6 · BINDING
REAL-003	File opening/saving should use realistic menus/dialogs/folders/filenames rather than a magic “open/save complete” button.	Grades 2–6 · BINDING
REAL-004	When a stage requires opening or saving a file, expose the standard access path(s) appropriate to the simulated software rather than only a contrived shortcut.	Grades 2–6 · BINDING
REAL-005	File dialogs should include meaningful folder navigation, file selection, filename fields, and enabled/disabled action buttons when those actions are being learned.	Grades 3–6 · ESTABLISHED
REAL-006	Double-click folders to open them in later realistic file-manager tasks; single click selects.	Grades 3–6 · BINDING
REAL-007	When saving requires a specific extension, validate the complete requested filename including the extension.	Grades 4–6 · ESTABLISHED
REAL-008	When exact spelling/capitalization is part of the task, validate exact spelling/capitalization.	Grades 2–6 · BINDING
REAL-009	Do not silently autocorrect or lowercase typed answers in exact-entry stages.	Grades 2–6 · BINDING
REAL-010	Model both menu-based and shortcut-based copy/paste when both are taught.	Grades 4–6 · BINDING
REAL-011	For menu-based copy/paste, require real text/image selection followed by right-click/menu commands in the correct workspace.	Grades 4–6 · ESTABLISHED
REAL-012	For shortcut copy/paste, require actual Ctrl+C/Ctrl+V and a target focus/caret/selection state.	Grades 4–6 · ESTABLISHED
REAL-013	When copying an image, select the image itself; when copying text, select the intended text range. Keep clipboard type/state distinct.	Grades 4–6 · ESTABLISHED
REAL-014	Formatting actions must operate on a selected text range or active paragraph as real software would.	Graphis · BINDING
REAL-015	Ctrl+A should select the entire intended text region; formatting should fail with a constructive hint if the required full selection is missing.	Graphis · ESTABLISHED

Rule ID	Requirement	Scope / status
REAL-016	Support the taught text-formatting tools (bold, italic, underline, font, size, color, highlight, alignment, lists, undo) with real state effects.	Graphis · ESTABLISHED
REAL-017	If Undo is the learning objective, it must genuinely reverse the most recent relevant simulated action.	Graphis/other editors · BINDING
REAL-018	Numbered lists and bulleted lists should affect the correct selected/list region and teach when order matters vs. does not.	Graphis · ESTABLISHED
REAL-019	For presentation software, provide recognizable slide thumbnails, main canvas, menus/toolbars, status information, and optional side panels as needed.	Grade 5+ · ESTABLISHED
REAL-020	Slide management should use realistic operations such as context-menu duplicate/delete/new and pointer drag for reordering when taught.	Grade 5+ · BINDING
REAL-021	Presentation playback should respond to authentic keyboard controls where those controls are taught.	Grade 5+ · BINDING
REAL-022	Transition effects should be applied through a credible transition panel/menu and should visibly affect the presentation state.	Grade 5+ · ESTABLISHED
REAL-023	Object animations should require selecting the intended slide object before choosing an effect.	Grade 5+ · BINDING
REAL-024	Selected slide title/image/shape objects must display professional-style bounding/selection frames while selected.	Grade 5+ · BINDING
REAL-025	Spreadsheet tasks should use actual cell selection/entry/operation behavior where the lesson targets spreadsheet skills.	Grades 5–6 · BINDING
REAL-026	Data sorting/filtering tasks should change which rows/order are visible, not simply mark an answer choice.	Grades 5–6 · ESTABLISHED
REAL-027	Browser tasks should use a believable address/navigation/content area when URL, searching, source evaluation, or copy operations are being practiced.	Grades 3–6 · ESTABLISHED
REAL-028	Keep browser and document workspaces visually distinct when learners transfer content between apps.	Grades 4–6 · ESTABLISHED
REAL-029	When an app has a start screen (e.g., blank document/template), require the learner to choose the relevant start option if that is part of the authentic workflow.	Grades 4–6 · ESTABLISHED
REAL-030	Do not place instructional controls inside a simulated app in a way that makes them look like real app functions. Keep task guidance visually separate.	Grades 3–6 · BINDING
REAL-031	At upper grades, use realistic panels, menus, status bars, dialogs, and keyboard focus without turning the interface into a vendor clone.	Grades 5–6 · BINDING
REAL-032	When a learner selects a title/image/object, selection must occur immediately—not only after pressing an “Edit” button.	Object-based editors · BINDING
REAL-033	If a command is intentionally out of scope in the current stage, provide a neutral disabled/no-op state rather than false success.	Grades 3–6 · ESTABLISHED
REAL-034	Authentic file/app state should persist within a multi-step stage where the next action depends on previous work.	Grades 4–6 · BINDING
REAL-035	When moving between simulated apps in one activity, preserve the virtual clipboard and relevant file/document state.	Grades 4–6 · ESTABLISHED

Rule ID	Requirement	Scope / status
REAL-036	Use the real Enter key before new-line typing when that is the target word-processing behavior.	Word processing · BINDING
REAL-037	Use the real Tab key for table-cell advancement when the task explicitly teaches that workflow.	Upper grades · ESTABLISHED
REAL-038	Exact typed fields may intentionally disable paste so the learner demonstrates typing rather than copying.	Upper grades · ESTABLISHED

10. Programming, movement, matching and drag interactions

These interaction families carry several unusually precise rules because small deviations can change what the learner is actually practicing.

Rule ID	Requirement	Scope / status
PMM-001	Movement-command blocks use an arrow/direction plus a dropdown/chooser for the number of steps where this visual language has been established.	G1 movement family · BINDING
PMM-002	Do not require typed movement counts when the established movement block uses a number dropdown.	G1 movement family · BINDING
PMM-003	Keep the movement grid at a fixed overall geometry; do not resize it between visits/stages.	Movement tasks · BINDING
PMM-004	Grid cells must remain equal squares.	Movement tasks · BINDING
PMM-005	The avatar/animal/robot should update in real time or in a clearly replayable preview as commands are added when that supports the lesson.	Movement tasks · ESTABLISHED
PMM-006	Reset returns the moving character to the starting tile/orientation and clears the command sequence as appropriate.	Movement tasks · BINDING
PMM-007	When repeated movement is intentionally represented as separate commands, preserve the separate blocks rather than compressing them into one count.	G1 lesson-specific · BINDING
PMM-008	Programming interfaces must be neutral educational environments; do not copy Scratch/mBlock UI exactly.	Programming tasks · BINDING
PMM-009	Use Noesis icons/blocks/code where the AthenaOS programming-family abstraction is desired.	AthenaOS programming · BINDING
PMM-010	When the source lesson specifically teaches Scratch/ScratchJr concepts, preserve the curricular concept while using a neutral simulation treatment unless exact platform identification is required.	Grades 1–6 · BINDING
PMM-011	Programming stages should validate program structure/sequence/output, not the mere presence of blocks.	Programming tasks · ESTABLISHED
PMM-012	For sequence tasks, wrong order should be distinguishable from missing steps so feedback can be specific.	Programming/algorithm tasks · ESTABLISHED

Rule ID	Requirement	Scope / status
PMM-013	For matching, require drag-to-draw-line when the established matching specification applies.	Matching tasks · BINDING
PMM-014	During a matching drag, display a temporary line from the start point to the current pointer position.	Matching tasks · BINDING
PMM-015	On release, an incorrect matching line disappears.	Matching tasks · BINDING
PMM-016	On release, a correct matching line remains visible and the matched pair stays marked.	Matching tasks · BINDING
PMM-017	Do not substitute “click left item, then click right item” for a draw-line matching task unless a new lesson explicitly changes the interaction.	Matching tasks · BINDING
PMM-018	Correct matched lines must redraw accurately after layout changes/resizes when the matching activity remains usable on that viewport.	Matching tasks · ESTABLISHED
PMM-019	For ordinary drag-and-drop (not line matching), reject invalid drops cleanly and keep the dragged item available for retry.	Drag/drop tasks · ESTABLISHED
PMM-020	When a target tile should retain the character after successful movement, do not snap the character back before the learner receives feedback.	Movement tasks · BINDING
PMM-021	When a path is built gradually over several stages, preserve the intended progressive construction instead of revealing the full path at the start.	G1 lesson-specific · BINDING

11. Technical implementation and quality assurance

These implementation standards are distilled from the final delivered simulation architecture and from recurring corrections made during the six-grade build.

Rule ID	Requirement	Scope / status
TECH-001	Use UTF-8 and declare Greek language/content correctly in the HTML.	All · ESTABLISHED
TECH-002	Include a responsive viewport configuration and avoid fixed layouts that clip on ordinary school displays.	All · ESTABLISHED
TECH-003	Prefer a self-contained HTML/CSS/JavaScript artifact for reliable classroom use unless the lesson explicitly needs external assets/services.	All · ESTABLISHED
TECH-004	Keep stage state explicit so progress, reset, and validation remain deterministic.	All · ESTABLISHED
TECH-005	Guard against duplicate advancement during transition delays.	All · ESTABLISHED
TECH-006	When using re-rendered stages, remove or replace obsolete event handlers/timers so old state cannot fire later.	Grades 4–6 · ESTABLISHED
TECH-007	Preserve shuffled option order within a subtask instead of reshuffling every time state changes.	Grades 5–6 · ESTABLISHED
TECH-008	Use accessible live feedback regions/semantic button elements where practical rather than non-semantic clickable divs.	All · ESTABLISHED
TECH-009	Use real disabled attributes/states for unavailable controls.	All · ESTABLISHED

Rule ID	Requirement	Scope / status
TECH-010	Ensure every stage can be completed through its intended interaction path from a fresh load.	All · BINDING
TECH-011	Test every wrong-answer/retry path so the learner can recover without stale state.	All · BINDING
TECH-012	Test reset/restart after partial completion, not only from the initial screen.	All · BINDING
TECH-013	Test the cumulative stage independently for each required sub-action; no hidden completion should carry over from guided stages.	All · BINDING
TECH-014	Test at least one common laptop width and one narrower/mobile/tablet width for clipping, overflow, and target size.	All · BINDING
TECH-015	Test keyboard-specific lessons using the physical keys expected by the learner.	Grades 4–6 · BINDING
TECH-016	Test right-click/drag interactions with actual pointer events rather than only synthetic button clicks.	Grades 3–6 · BINDING
TECH-017	For matching-line tasks, verify the line follows the pointer, wrong lines vanish, correct lines persist, and resize handling does not detach lines.	Matching tasks · BINDING
TECH-018	For exact typing tasks, verify case sensitivity and whitespace/new-line expectations exactly match the instruction.	Grades 2–6 · BINDING
TECH-019	For object-editor tasks, verify selection frame appears immediately and stays on the current selected object.	Grade 5+ · BINDING
TECH-020	For file dialogs, verify the correct folder/file selection gates the Open/Insert/Save action.	Grades 3–6 · BINDING
TECH-021	Do not leave developer/debug controls visible in the classroom build.	All · ESTABLISHED
TECH-022	Avoid network dependencies for decorative assets when the same visual can be embedded locally in HTML/SVG.	All · ESTABLISHED
TECH-023	Use SVG/CSS icons/illustrations consistently when generated or external images are not required.	All · ESTABLISHED
TECH-024	Before delivery, complete an interaction-by-interaction functional pass, not only a visual inspection.	All · BINDING

12. Grade 1 retained specifications and lesson milestones

Grade 1 established the foundational interaction language: sequential stages, consistent Help, automatic progression, clear reset, fixed movement grids, visual accessibility, and extremely low reading demand.

Rule ID	Requirement	Scope / status
G1-001	All Grade 1 simulations are in Greek.	Grade 1 · BINDING
G1-002	Use very little text for early-year lessons; learners may not yet know all letters.	Grade 1 early year · BINDING
G1-003	Use playful, vivid, highly visual scenes while keeping the learning target obvious.	Grade 1 · BINDING

Rule ID	Requirement	Scope / status
G1-004	Use the Lesson 1 Help button icon/design/popup structure consistently across Grade 1 activities.	Grade 1 · BINDING
G1-005	Successful stages advance automatically; do not add a generic Next button.	Grade 1 · BINDING
G1-006	Stage numbers are centered in progress circles.	Grade 1 · BINDING
G1-007	Clicking a selectable object again deselects it.	Grade 1 · BINDING
G1-008	Reset returns characters/animals/robots to the start and clears relevant stage state.	Grade 1 · BINDING
G1-009	Movement blocks use the established arrow + number-dropdown style from the Grade 1 movement lessons.	Grade 1 movement · BINDING
G1-010	Movement grids use fixed equal square cells.	Grade 1 movement · BINDING
G1-011	Use non-color cues alongside color in every answer/instruction where color could otherwise be decisive.	Grade 1 · BINDING
G1-012	Matching tasks that use lines must use the draw-by-drag line interaction; wrong line disappears, correct line remains.	Grade 1 · BINDING
G1-013	Do not generate or introduce new illustrative images unless explicitly requested; work with HTML/CSS/SVG or supplied references.	Grade 1 · BINDING
G1-014	Lessons 13–18 occur later in the year, so somewhat more text is acceptable while remaining visual and age-appropriate.	G1 L13–18 · BINDING
G1-015	Lessons 19–22 are treated as beginning-of-year activities; return to minimal text and strong icon/shape/position support.	G1 L19–22 · BINDING

12.1 Grade 1 lesson-derived retained corrections

These narrow items are preserved because they were explicit corrections during the Grade 1 build. They should not be generalized blindly to unrelated lessons.

Rule ID	Requirement	Scope / status
G1-L1-01	Remove the later-proposed Stage 3 reordering activity from Lesson 1; do not restore it in the current lesson design.	Lesson 1 · LESSON-SPECIFIC
G1-L1-02	Keep progress numbers centered and movement-grid tiles equal squares.	Lesson 1 · LESSON-SPECIFIC
G1-L1-03	The final cumulative movement-command dropdown starts blank where the learner must make the choice.	Lesson 1 · LESSON-SPECIFIC
G1-L1-04	Reset returns the moving character/robot to the exact start state.	Lesson 1 · LESSON-SPECIFIC
G1-L2-01	Merge the pencil-case and books concept where previously split; avoid duplicate treatment.	Lesson 2 · LESSON-SPECIFIC
G1-L2-02	Randomize the relevant step set and remove the duplicate arrow issue.	Lesson 2 · LESSON-SPECIFIC

Rule ID	Requirement	Scope / status
G1-L2-03	The “put the steps in order” cumulative task belongs in Lesson 2 rather than being restored to Lesson 1.	Lesson 2 · LESSON-SPECIFIC
G1-L3-01	In the “find the wrong command” task, select/replace only the incorrect arrow; erase/delete is disabled.	Lesson 3 · LESSON-SPECIFIC
G1-L4-01	Use the two-column non-reader matching design: arrows on one side and the animal/two-square movement frame on the other where specified.	Lesson 4 · LESSON-SPECIFIC
G1-L4-02	Use draw-line matching rather than click-pair matching.	Lesson 4 · LESSON-SPECIFIC
G1-L4-03	Preserve the worm/character animation state correctly after interaction; it must not vanish or reset unexpectedly.	Lesson 4 · LESSON-SPECIFIC
G1-L5-01	For the corrected binary-choice item, the correct answer is on the left.	Lesson 5 · LESSON-SPECIFIC
G1-L6-01	Use a sea-depth scene and sea animal (dolphin), not the earlier butterfly concept.	Lesson 6 · LESSON-SPECIFIC
G1-L6-02	Build the path gradually across stages; do not reveal the whole route at once.	Lesson 6 · LESSON-SPECIFIC
G1-L6-03	Remove the trash frame/bubble clutter specified for removal; keep vivid but purposeful scenery.	Lesson 6 · LESSON-SPECIFIC
G1-L6-04	Maintain the fixed grid dimensions and established movement-block styling.	Lesson 6 · LESSON-SPECIFIC
G1-L6-05	Where seven moves to the right are required as seven separate blocks, keep seven separate blocks rather than compressing them.	Lesson 6 · LESSON-SPECIFIC
G1-L7-01	For the Moon→Earth activity, start the missile above the Moon with clear space between Moon and Earth in the early tiles.	Lesson 7 · LESSON-SPECIFIC
G1-L7-02	Keep the grid visible and remove the unwanted overlay shape.	Lesson 7 · LESSON-SPECIFIC
G1-L7-03	Use the Lesson 6/7 arrow+dropdown movement-block style; do not add the removed “Add” symbol.	Lesson 7 · LESSON-SPECIFIC
G1-L7-04	Ensure the first stage presents three genuinely distinct tiles/options.	Lesson 7 · LESSON-SPECIFIC
G1-L7-05	Use an improved Moon-surface visual, add rocks where specified, and provide animation preview in the relevant stage.	Lesson 7 · LESSON-SPECIFIC
G1-L7-06	In the corrected tile, Play comes first; simplify the later stage as agreed and keep the merged-stage structure where finalized.	Lesson 7 · LESSON-SPECIFIC
G1-L8-01	Use the Lesson 6/7 movement-block style as the baseline and keep the simplified imagery/merged-stage structure finalized for Lesson 8.	Lesson 8 · LESSON-SPECIFIC
G1-L9-01	Keep the ladybug on the target tile after it reaches the destination.	Lesson 9 · LESSON-SPECIFIC
G1-L9-02	Use flower types that are distinguishable by more than color (daisies, roses, sunflowers) and preserve the intermediate target marker.	Lesson 9 · LESSON-SPECIFIC

Rule ID	Requirement	Scope / status
G1-L9-03	Update the movement preview in real time as each block is added.	Lesson 9 · LESSON-SPECIFIC
G1-L10-01	Remove mouse/keyboard icons from the corrected answer tile in Stage 5.	Lesson 10 · LESSON-SPECIFIC
G1-L11-01	Use A/B/Γ labels in Stage 2 as finalized.	Lesson 11 · LESSON-SPECIFIC
G1-L11-02	Do not restore the replaced Stage 4 laptop+mouse task; retain the clearer replacement and clarified Stage 5.	Lesson 11 · LESSON-SPECIFIC
G1-L11-03	Use the simpler replacement example instead of the rejected “bed” example.	Lesson 11 · LESSON-SPECIFIC
G1-L12-01	Model power-on/open/close/shutdown across virtual desktop/laptop/tablet/phone devices.	Lesson 12 · LESSON-SPECIFIC
G1-L12-02	Use platform-neutral device UIs: desktop/laptop may evoke modern Linux-like clarity and tablet/phone may sit between iOS/Android conventions without cloning either.	Lesson 12 · LESSON-SPECIFIC
G1-L12-03	Use selection tiles and automatic progression; do not add a generic Next button.	Lesson 12 · LESSON-SPECIFIC
G1-UNIT2-01	Use the olive/lime green taken from the Unit 2 book reference for completed-stage circles and the “Έλεγχος” button.	Grade 1 Unit 2 · BINDING

13. Grade 2 retained specifications

Grade 2 keeps the Grade 1 scaffolding model but begins to introduce more recognizable OS/application workflows, exact text behavior, and a coherent AthenaOS software family.

Rule ID	Requirement	Scope / status
G2-001	Carry forward the global stage/Help/feedback/reset/accessibility model, but increase reading and procedural demand gradually.	Grade 2 · BINDING
G2-002	Do not display the header “Πληροφορική Β΄ Δημοτικού” in Grade 2 HTML activities.	Grade 2 · BINDING
G2-003	Use AthenaOS for OS/application interactions with a coherent family look, not a vendor clone.	Grade 2+ · BINDING
G2-004	Use the canonical application names Graphis, Chroma, Praxis, Ploigos, Ennoia, and Noesis where those application types appear.	Grade 2+ · BINDING
G2-005	Use “Noesis icons / Noesis blocks / Noesis code” as the programming-family sublabels.	Grade 2+ · BINDING
G2-006	When opening/saving a file is part of the task, model the standard menu/toolbar/file-dialog access required by the simulated software rather than a magic direct action.	Grade 2+ · BINDING
G2-007	Text-entry validation is case-sensitive where an exact answer is requested.	Grade 2 · BINDING
G2-008	Do not automatically convert the learner’s typed answer to lowercase or otherwise ignore capitalization.	Grade 2 · BINDING

Rule ID	Requirement	Scope / status
G2-009	When adding new text after an existing line/paragraph in a word-processing simulation, require the real Enter key first, then typing on the new line.	Grade 2+ · BINDING
G2-010	Do not tell the learner to type at the end of an existing line and press Enter afterwards when the task is to create a new line first.	Grade 2+ · BINDING
G2-011	Use Grade 2 Unit 4 red #D93A2E as the unit visual identity where that unit is being simulated.	Grade 2 Unit 4 · BINDING
G2-012	Ennoia is the AthenaOS concept/mind-mapping application and should visually match the AthenaOS family.	Grade 2+ · BINDING
G2-013	For programming/robotics tasks, preserve age-appropriate icon/block logic and avoid overwhelming software chrome.	Grade 2 · BINDING
G2-014	Keep the final cumulative activity genuinely integrative rather than duplicating a guided stage.	Grade 2 · BINDING

14. Grade 3 evolution

Grade 3 is the bridge from icon-heavy early-primary interaction to recognizable software and block-programming workflows.

Rule ID	Requirement	Scope / status
G3-001	Increase interface realism and reading demand compared with Grades 1–2 while keeping instructions concise and supported by clear controls.	Grade 3 · BINDING
G3-002	Use transferable programming concepts rather than cloning the exact Scratch UI; the source curriculum may still explicitly refer to Scratch.	Grade 3 · BINDING
G3-003	Treat single click, double-click, right-click, files/folders, windows, and browser concepts as real interactions when they are the lesson objective.	Grade 3 · BINDING
G3-004	Keep Help, progress, immediate feedback, automatic stage advancement, and final cumulative practice from the lower grades.	Grade 3 · BINDING
G3-005	Begin using more conventional software layouts—menus, panes, toolbars—where the topic warrants them, without making the interface visually adult or crowded.	Grade 3 · ESTABLISHED
G3-006	Use actual user actions to prove procedural learning; avoid replacing a software operation with a multiple-choice statement about the operation.	Grade 3 · BINDING
G3-007	Use more text than Grade 1–2 only when it supports the source lesson; retain age-appropriate wording and accessible layout.	Grade 3 · BINDING
G3-008	Continue the platform-neutral visual policy across operating systems, office software, and programming environments.	Grade 3 · BINDING

15. Grade 4 evolution

Grade 4 establishes mature procedural simulations: real selection, keyboard shortcuts, browser-to-document workflows, file dialogs, formatting, and coherent AthenaOS multi-app behavior.

Rule ID	Requirement	Scope / status
G4-001	Use a visibly more realistic AthenaOS desktop/application environment than in the early grades.	Grade 4 · BINDING
G4-002	Graphis, Ploigos, Ennoia, Domi and other AthenaOS-family workspaces should share coherent icon/window/menu styling.	Grade 4 · ESTABLISHED
G4-003	Teach application launch with single-click selection followed by double-click open when appropriate.	Grade 4 · BINDING
G4-004	In Graphis, require real text selection before formatting the selected text.	Grade 4 · BINDING
G4-005	Support actual Ctrl+A for whole-text selection where taught.	Grade 4 · BINDING
G4-006	Support the taught alignments by changing paragraph alignment state, not by scoring button choice only.	Grade 4 · ESTABLISHED
G4-007	Support font family, size, font color, highlighting, and Undo with genuine state changes when taught.	Grade 4 · ESTABLISHED
G4-008	Support numbered lists and bullet lists as actual formatting behavior in the relevant activity.	Grade 4 · ESTABLISHED
G4-009	When moving content from Ploigos to Graphis, require actual text/image selection and right-click Copy/Paste where that route is taught.	Grade 4 · BINDING
G4-010	When keyboard shortcuts are taught, require Ctrl+C/Ctrl+V as a separate authentic route.	Grade 4 · BINDING
G4-011	Model “Save image as…” through Domi/file dialog, including opening the correct folder and entering the requested filename/extension.	Grade 4 · ESTABLISHED
G4-012	Model image insertion in Graphis through a credible Insert/Image file-selection workflow.	Grade 4 · ESTABLISHED
G4-013	Use exact file names/extensions where the lesson requires them; do not accept merely similar names.	Grade 4 · ESTABLISHED
G4-014	The cumulative stage should allow the legitimate method(s) already taught—for example menu copy/paste or Ctrl+C/Ctrl+V—while still validating the final document state.	Grade 4 · ESTABLISHED
G4-015	Use self-assessment tables after the cumulative task when the source lesson includes learning-objective self-assessment.	Grade 4 · ESTABLISHED
G4-016	Keep task guidance outside the simulated application chrome so the learner can distinguish teacher prompt from app commands.	Grade 4 · BINDING
G4-017	Use real context menus near the pointer position and close them on outside click.	Grade 4 · ESTABLISHED
G4-018	Maintain virtual clipboard/file state across app tabs during multi-app tasks.	Grade 4 · ESTABLISHED

16. Grade 5 evolution

Grade 5 strengthens authentic software manipulation and adds an explicit professional-selection-frame rule for presentation/object-based editors.

Rule ID	Requirement	Scope / status
G5-001	Continue Grade 4 procedural realism but increase task complexity and reduce childlike visual treatment.	Grade 5 · BINDING
G5-002	For object-based editors/presentation software, selected on-canvas objects must immediately show a clear selection frame/bounding box.	Grade 5 · BINDING
G5-003	Show visible handles where appropriate and keep the frame until selection changes.	Grade 5 · BINDING
G5-004	Presentation-slide management should use authentic context-menu operations and drag reordering when those skills are taught.	Grade 5 · ESTABLISHED
G5-005	When slideshow control is taught, use the real F5, arrow keys, and Esc.	Grade 5 · ESTABLISHED
G5-006	Transitions and object animations must alter simulated presentation state and require the correct selected slide/object.	Grade 5 · ESTABLISHED
G5-007	Use visible subtask checkmarks only after each operation has actually been completed.	Grade 5 · ESTABLISHED
G5-008	Support authentic spreadsheet/data interactions for collection, arithmetic, charts, and analysis when those are the lesson objectives.	Grade 5 · BINDING
G5-009	Support browser/search/file/presentation workflows through credible controls rather than quiz-only substitutes.	Grade 5 · BINDING
G5-010	For multi-action final tests, preserve authentic state across operations so the learner builds a complete result.	Grade 5 · BINDING
G5-011	Use Grade 5 Unit 5 orange #EA922C and blue-purple #545F99 consistently as that unit’s visual identity.	Grade 5 Unit 5 · BINDING
G5-012	Preserve accessibility while using the Unit 5 palette; orange/purple alone must never encode the only distinction.	Grade 5 Unit 5 · BINDING
G5-013	Use more mature typography, spacing, panels, and software proportions than Grade 4 where possible without reducing clarity.	Grade 5 · BINDING
G5-014	Final self-assessment may use a four-level matrix; it is reflective, not scored correct/incorrect.	Grade 5 · ESTABLISHED
G5-015	Do not fake slide-object selection by highlighting a side-panel row only; selection must be visible on the canvas object itself.	Grade 5 · BINDING

17. Grade 6 final-state specification

Grade 6 is the culmination of the design evolution. The shell remains recognizably from the same series, but its visual and interaction model is deliberately closer to real productivity/software environments.

Rule ID	Requirement	Scope / status

Rule ID	Requirement	Scope / status
G6-001	Preserve the functional/interaction foundations established by Grade 5.	Grade 6 · BINDING
G6-002	Do not simply copy Grade 5 simulations. Redesign the GUI, activities, visual treatment, and content to feel more mature and age-appropriate.	Grade 6 · BINDING
G6-003	Make Grade 6 software simulations increasingly similar to real software in interaction density and workflow while remaining fictional/platform-neutral.	Grade 6 · BINDING
G6-004	Use a more restrained, professional shell with larger credible workspaces, denser controls, and less childlike decoration.	Grade 6 · BINDING
G6-005	The number of activities/stages is flexible and must be determined by the lesson content; there is no fixed “4 + final” requirement at Grade 6.	Grade 6 · BINDING
G6-006	Still include a cumulative final task and self-assessment when appropriate to the lesson/book structure.	Grade 6 · BINDING
G6-007	Use realistic forms, data tables, filters, dialogs, editor panels, and multi-step software workflows where they are the target skill.	Grade 6 · BINDING
G6-008	Use visible keyboard focus and actual keyboard operations for tasks involving Tab, shortcuts, or software navigation.	Grade 6 · ESTABLISHED
G6-009	Exact-entry tasks may require exact text and may block paste when typing itself is being assessed.	Grade 6 · ESTABLISHED
G6-010	Matching retains the project draw-line contract: drag from start dot, temporary line follows pointer, wrong line vanishes, correct line remains.	Grade 6 · BINDING
G6-011	Multi-select items must support clear selected state plus check/symbol cues, not color alone.	Grade 6 · BINDING
G6-012	Complex activities may contain internal rounds/cases while remaining one lesson stage; maintain clear case/substep progress.	Grade 6 · ESTABLISHED
G6-013	Option shuffling should remain stable within the current case so re-rendering a selected state does not move answers unexpectedly.	Grade 6 · ESTABLISHED
G6-014	Wrong answers in final/mature activities should not automatically reveal the correct answer; support retry.	Grade 6 · ESTABLISHED
G6-015	Graphis can model higher-level document tasks such as tables, exact cell entry, drag-in assets, Tab navigation, and structured content creation.	Grade 6 · ESTABLISHED
G6-016	Maintain unit identity while prioritizing mature UI hierarchy and high information clarity.	Grade 6 · BINDING
G6-017	Final Grade 6 builds may use the orange #EA922C and blue-purple #545F99 mature shell palette where that unit/reference uses it.	Grade 6 Unit 5 · ESTABLISHED
G6-018	The final-state quality bar is “credible educational software”: realistic enough to transfer the skill, simplified enough for classroom learning, and neutral enough not to depend on a vendor UI.	Grade 6 · BINDING
G6-019	Grade 6 Lesson 30 confirms flexible scale: a lesson may contain many substantial activities when the source content requires them, rather than being artificially compressed.	Grade 6 · ESTABLISHED

18. Color and identity registry

Only colors with explicit retained status or strong final-build evidence are elevated here. Reference images remain authoritative for units whose exact swatch was not separately recorded.

Rule ID	Requirement	Scope / status
COLOR-001	Grade 1 Unit 2: olive/lime green taken directly from the supplied Unit 2 reference; use for completed-stage circles and “Ελεγχος” button.	G1 Unit 2 · BINDING
COLOR-002	Grade 2 Unit 4: red RGB (217,58,46), hex #D93A2E.	G2 Unit 4 · BINDING
COLOR-003	Grade 5 Unit 5: orange RGB (234,146,44), hex #EA922C.	G5 Unit 5 · BINDING
COLOR-004	Grade 5 Unit 5 secondary: blue-purple RGB (84,95,153), hex #545F99.	G5 Unit 5 · BINDING
COLOR-005	Final Grade 6 Unit 5 builds use #EA922C and #545F99 as the mature shell accent pair.	G6 Unit 5 · ESTABLISHED
COLOR-006	Some delivered Grade 4 lessons use lesson/unit-specific reds/oranges with #545F99 secondary. Treat those as local implementation identities, not a global Grade 4 mandate unless the book reference for that unit specifies them.	G4 · ESTABLISHED
COLOR-007	Whenever a source-book reference supplies a unit color, the source reference overrides generic palette preference.	All · BINDING
COLOR-008	No palette may be used as the only means of encoding answer, state, or category.	All · BINDING

19. Reuse protocol for future books

Apply specifications in layers. This protects the accumulated interaction quality while allowing a future edition to look fresher and better suited to a new age group or book.

Rule ID	Requirement	Scope / status
REUSE-001	Start every new simulation by loading the global BINDING rules from this document.	Future books · BINDING
REUSE-002	Overlay the target grade rules, then the target unit identity, then the current lesson-specific instructions.	Future books · BINDING
REUSE-003	If the future book uses a different age group, preserve the interaction principles but recalibrate reading density, visual maturity, and software realism.	Future books · BINDING
REUSE-004	Reuse AthenaOS and canonical app names when continuity across books is desired; do not rename apps casually.	Future books · BINDING
REUSE-005	Reuse interaction patterns (Help, progress, matching, movement, file dialogs, selection frames) as modular components, but adapt content and visuals to the new lesson.	Future books · ESTABLISHED
REUSE-006	Do not copy a previous lesson’s number of stages; derive stage count from the new lesson’s meaningful subskills.	Future books · BINDING
REUSE-007	Do not copy previous distractors, story, scenery, or question order unless they remain pedagogically appropriate.	Future books · BINDING

Rule ID	Requirement	Scope / status
REUSE-008	When modernizing a simulation, preserve actual behavior first; visual redesign must not downgrade real operations into fake buttons.	Future books · BINDING
REUSE-009	When adding a new rule, assign a new stable rule ID and record whether it is global, grade-specific, unit-specific, or lesson-specific.	Archive maintenance · ESTABLISHED
REUSE-010	When superseding a rule, record the replacement rule ID and date in the change log.	Archive maintenance · ESTABLISHED
REUSE-011	Before reuse, run the master pre-delivery checklist in Appendix A and document any intentional exceptions.	Future books · ESTABLISHED

Appendix A. Master pre-delivery checklist

☐ **Structure:** Stages reflect meaningful subskills; cumulative final task exists; self-assessment included when appropriate; no filler stages.

☐ **Progression:** Correct completion advances automatically; no generic Next button; progress numbers centered; current/done/pending states clear.

☐ **Validation:** Success is based on actual state/action; wrong paths recover; exact-set tasks validate all choices; final does not inherit hidden success.

☐ **Help:** Help exists and is stage-specific; Grade 1 uses the Lesson 1 Help pattern; Help does not simply reveal the answer.

☐ **Reset:** Resets all local state; movement characters return to start; selections/animations/counters reset.

☐ **Accessibility:** No color-only decisions; readable contrast; large targets; unclipped labels; keyboard focus where needed; instructions age-appropriate.

☐ **Selection:** Click toggling behaves correctly; software selection is visually obvious; Grade 5+ object editors show bounding frames/handles.

☐ **Matching:** Drag draws a live line; wrong line disappears; correct line remains; geometry stays attached after resize.

☐ **Movement:** Arrow+dropdown format where established; no typed step counts; fixed equal-square grid; preview and reset behave correctly.

☐ **Typing:** Case sensitivity matches the rule; exact text stays exact; Enter-before-new-line rule enforced where relevant; paste blocked only when typing is the skill.

☐ **Mouse:** Single/double/right-click behave authentically where taught; drag requires actual hold/move/release; scroll wheel used when taught.

☐ **Keyboard:** Actual Ctrl+A/C/V, Tab, F5, arrows, Esc used where taught; focus remains on the logical target.

☐ **Files:** Open/save/insert use credible dialogs; folder selection works; filenames/extensions validate; buttons disabled until valid state.

☐ **Software realism:** Menus/toolbars/panels act on real simulated state; Undo genuinely reverses; copy/paste maintains clipboard type; task guidance is outside app chrome.

☐ **AthenaOS:** Correct branding and canonical app names; no accidental vendor clone; grade-appropriate realism; AthenaOS omitted when irrelevant.

☐ **Visuals:** Reference-book visual language respected; unit palette correct; responsive layout; no unnecessary decorative clutter or generated images.

☐ **Grade fit:** Reading, density, and realism match grade progression; Grade 6 is not a copied Grade 5 shell.

☐ **Technical:** Fresh-load completion tested; retry/reset tested; duplicate event/timer issues absent; common laptop and narrow layout tested.

Appendix B. Chronological milestone map

This map records the major specification evolution across the six-grade build. It is intentionally about reusable design decisions, not lesson content.

Milestone	Specification contribution
Grade 1, early lessons	Established sequential stages, visual progress, consistent Help, automatic advancement, minimal-text design, click toggling, reset, movement grids, and cumulative tasks.
Grade 1 movement/matching lessons	Standardized arrow + dropdown movement blocks, fixed equal-square grids, character reset, real-time/replay preview, and the drag-to-draw matching-line contract.
Grade 1 Unit 2	Applied unit-specific olive/lime identity and strengthened the rule that color may not be the sole cue.
Grade 1 later lessons	Allowed somewhat more text for lessons taught later, then explicitly returned to minimal text for Lessons 19–22 because they function as beginning-of-year material.
Grade 2	Carried forward the shell while introducing more recognizable AthenaOS/app/file workflows, exact case-sensitive typing, and the Enter-before-new-line behavior.
Grade 3	Shifted toward conventional software and block-programming interaction, retaining neutral platform-independent visuals and authentic mouse actions.
Grade 4	Established mature AthenaOS multi-app workflows: Graphis/Ploigos/Ennoia/Domi, double-click launch, real text selection, Ctrl+A/C/V, right-click menus, formatting, Undo, file save/open/insert dialogs.
Grade 5	Expanded realistic presentation/spreadsheet/browser/data workflows and added the explicit rule that selected on-canvas objects display professional bounding frames/handles.
Grade 5 Unit 5	Fixed the orange #EA922C + blue-purple #545F99 visual identity.
Grade 6	Retained functionality while intentionally redesigning the UI to be more mature and software-like; stage count became explicitly content-driven rather than template-driven.
Grade 6 final lessons	Confirmed large multi-activity lessons, stable shuffled states, exact-entry workflows, authentic Tab/keyboard operations, mature matching engine, data/document tasks, and strong final cumulative/self-assessment structure.

Archive change log

Version	Date	Scope	Change
1.0	11 Sep 2026	Grades 1–6	First consolidated archival master specification, covering the accumulated rules from Grade 1 Lesson 1 through Grade 6 Lesson 30.

END OF MASTER SPECIFICATION