



Curriculum and Instruction in UpSmart[™]

Now more than ever, teachers must be able to diagnose students' academic challenges, prescribe targeted learning experiences, and treat students' unique learning deficits more accurately and efficiently than ever before.

UpSmart empowers students and teachers to work smarter, not harder. Combining adaptive assessments with laser-focused instruction grounded in rigorous academic standards, UpSmart gives every student the practice and support needed to master high-stakes tests.

WHAT IS UPSMART?

UpSmart is an engaging, student-centered, supplemental program designed to:

- Prepare students for high-stakes tests with technology-enhanced items
- Reinforce state standards with personalized and adaptive practice, assessment, and instruction
- Provide ongoing data and analytics for educators, with standards-based reports that pinpoint specific skills

Designed by educators for today's busy classrooms, UpSmart features a thoughtful content organization that unpacks standards into key skills, organizes those skills into meaningful progressions, and allows students to "level up" through a series of student-friendly topics. The result: students will grow in their ability to apply what they've learned in class to a myriad of novel tasks that require strategic and adaptive thinking.

UNPACKING THE STANDARDS

UpSmart was developed with a team of nationally recognized researchers, practitioners, and experts in mathematics and reading education. The program is grounded in rigorous academic standards and capitalizes on the best research and thinking about how students learn best.

The skills in UpSmart are derived from state standards. Some standards encompass only one or two skills, while others have many. In the process of designing UpSmart, each standard was analyzed for its component skills. The skills were then grouped together to form the topics in the program. Each topic features a logical progression of skills, from Level A (bronze) to Level B (silver) to Level C (gold)—with the skills at each level gradually increasing in cognitive complexity.

Once the progressions were organized, they were then reviewed by academic advisors and practitioners to ensure coherence and to identify the most common stumbling blocks (i.e., common errors and misconceptions) students are likely to encounter with each level. This formed the blueprint for the instruction, tasks, and scaffolds in the program. As outlined in detail on the following pages, sometimes the skills within a particular standard are best treated within a single topic (i.e., they already form a logical progression in complexity). Other times, however, a standard may be covered across multiple topics or standards can be combined to form topics in various ways.

LEAD ACADEMIC ADVISORS

Edgenuity engaged Academic Advisors in both subjects to review the UpSmart scope and sequence, analyze skill progressions and their alignment to standards, identify potential misconceptions for each level of the program, and review instructional exemplars and guidelines.



Dr. Peter Afflerbach Professor of Education, University of Maryland

Dr. Afflerbach's research interests include individual differences in reading and reading development, reading assessment, reading comprehension, and the verbal reporting methodology. Peter is a former K–6 Chapter One reading teacher, a middle school remedial reading teacher, and a high school English teacher. Dr. Afflerbach is a standing member of the Reading Committee of the National Assessment of Educational Progress (NAEP), and a member of the Literacy Research Panel of the International Reading Association. Peter has served as Chair of the Literacy Assessment Committee of the International Literacy Association and on the Common Core State Standards Review and Feedback Panels. Peter has served on the International Literacy Association's Literacy Research Panel, and he was elected to the Reading Hall of Fame in 2009.

Peter is the author of numerous books, including *Understanding and Using Reading Assessment, K-12, 3rd Edition* (in preparation). He is the editor of the *Handbook of Individual Differences in Reading: Reader, Text, and Context* (2016), and co-editor of the *Handbook of Reading Research, 4th Edition* (2010) and *Handbook of Reading Research, 5th Edition* (forthcoming). He has published in numerous theoretical and practical journals, including *Reading Research Quarterly*, *Cognition and Instruction*, *Elementary School Journal*, *Journal of Reading*, *Journal of Reading Behavior*, *The Reading Teacher*, *Journal of Adolescent and Adult Literacy*, and *Language Arts*.



Dr. Charles M. Patton, Ph.D. Principal Scientist (ret.), SRI International

In 1982, Dr. Patton left his faculty position at the University of Utah to spearhead the development at Hewlett-Packard of a new class of device for teaching, learning, and using mathematics—the symbolic/numeric/graphical calculator. The success of the award-winning HP-28S and its descendants set the stage for Patton's ongoing research and development in mathematical understanding in mind and machine. Milestones include co-authoring an NSF-sponsored calculus-reform textbook series; establishing the first hand-held wireless web enabled classroom (1993/4); exhibiting the first web-interactive math textbook chapter at Frankfurt Book Fair; and developing the wireless networked classroom concept with Texas Instruments. On joining SRI in 2001, Patton continued and enlarged his research and development in technology-enhanced learning, including the GroupScribbles collaborative learning platform that achieved wide adoption in Singapore primary schools, the Proportionality DynaBook—a deep dive into Universal Design for Learning Mathematics—and the animated self/shared explanation tool DynaLogue. Patton also undertook a multi-year collaboration with the math education program leaders/authors/editors at Singapore's National Institute of Education to identify, learn, and translate to the U.S. context the principles, guiding metaphors, “tricks”, and qualities powering their mathematics learning content. In the past several years, sharing these learnings through curricular content analysis has assumed a prominent role in Patton's portfolio.

Single Standard Unpacked to Form a Topic

In some cases, a standard contains a clear progression of skills and corresponds directly to a topic. For example, consider the following Common Core standard:

6.EE.C.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.

This standard requires students to interpret a relationship between two variables from a visual display, model that relationship with an equation, and use that equation to solve real-world problems.

The Grade 6 UpSmart math topic “Dependent and Independent Variables” organizes the skills into a logical progression of cognitive complexity:

Dependent and Independent Variables

Level A: Bronze - Identify the relationship between two variables in a table or graph.

Level B: Silver - Model a given table, graph or scenario with an equation that relates the two variables.

Level C: Gold - Write a two-variable equation to solve a problem about real-world situations.

Single Standard across Multiple Topics

Other standards are addressed across multiple topics, which allows key skills to receive more time and emphasis. For example, the two Grade 6 ELA UpSmart topics entitled “Plot” and “Character” address skills in the following Common Core standard:

RL.6.3: Describe how a particular story’s or drama’s plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution.

Plot

Level A: Bronze - Identify plot structure.

Level B: Silver - Trace the development of plot.

Level C: Gold - Analyze the interaction between plot and story elements.

Level A of “Plot” addresses the foundational elements of the standard—the ability to identify the structure of the plot. In Level B, students “describe how a particular story’s or drama’s plot unfolds in a series of episodes,” which aligns with the first part of the standard. Finally, in Level C, students meet the more advanced elements of the standard as they describe “how the characters respond or change as the plot moves toward a resolution.”

Character

Level A: Bronze - Determine character traits.

Level B: Silver - Analyze how characters develop throughout a story.

Level C: Gold - Write about character development.

Here too, Level A addresses the foundational elements of the standard—the ability to identify character traits. However, in both Levels B and C of “Character,” students focus on the analysis of “how the characters respond or change as the plot moves toward a resolution.” In Level B, students complete system-scorable tasks to develop and reinforce this skill; in Level C, they complete written responses that support their analysis with specific examples from the texts they have read.

Multiple Standards Combined to Form Progression

In some cases, the progression within a topic draws from multiple standards. This ensures that students engage in practice, assessment, and instruction on skills that connect with skills in other standards—developing cohesion in their learning and not simply working on skills in isolation. In the Grade 6 UpSmart math topic “Box Plots and Histograms,” students cover the following Common Core standards:

6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

6.SP.B.5.c Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

Box Plots and Histograms

Level A: Bronze - Create a box plot or a histogram.

Level B: Silver - Find a measure of center or variability from a box plot or histogram.

Level C: Gold - Compare measures of center and variability from two box plots or two histograms.

The standard 6.SP.B.4 is partially covered here—the remainder of the standard is addressed in other topics that cover number lines and dot plots. Likewise, 6.SP.B.5.c is also partially covered here and partially covered elsewhere in the program. Note that the cognitive demands for these two standards are quite different. The first requires students to display data, while the second requires data analysis and interpretation. By unpacking the standards into skills and then organizing those skills into meaningful progressions within each topic, UpSmart allows students to build from the straightforward to the more advanced—topic by topic.

ASSESSMENT AND ADAPTIVITY

UpSmart features a pretest and post-test that can be used to benchmark growth. However, unlike many supplemental programs, UpSmart does not rely on an up-front diagnostic to customize topics into or out of a student’s learning path. Rather, it features a continually adaptive learning path for every learner, with short screeners for each topic. Rather than simply placing students into or out of a topic, these screeners pinpoint the exact level within each topic where each student is ready to begin.

Topic Screeners

Each Topic Screener is a short, targeted assessment designed to place students into Level A, B, or C for a single topic. It is not a diagnostic; that is, it does not comprehensively assess students on the full range of applications of the skills in each level. The program continues to assess and adapt to what students know and do not know *within* each level.

The Topic Screener first assesses the Level A skills. If the student does not demonstrate mastery, he is placed into Level A. If he does demonstrate mastery, the screener continues to assess his understanding of the more

advanced skills in the topic to place the student into Level B or C. The screener questions are all at the higher range of difficulty for the level. This is by design; if students are not able to answer the higher-difficulty questions, they cannot place out of the level. Students will be assessed on the easier questions within each level as part of the level adaptivity.

The screener will always place a student into Level A, B, or C; students cannot be screened out of a topic entirely. If students place into Level C, they will engage in further assessment and adaptivity at that level. This allows the screener to be as brief and targeted as possible, while also moving students through the level content at the appropriate pace and with the appropriate level of support and feedback.

Adaptivity within a Level

UpSmart's adaptive learning engine continually seeks to find out what each student knows and needs to know, in order to provide the right level of instruction and practice within each topic. With every student action, the program adjusts content for students based on their individual performance and needs—scaffolding more for students who need it and less for those who do not. As part of this continually adaptive approach, students level up or down based on their work on the tasks within the level. A student who struggles will level down into an easier level as needed; likewise, a student who demonstrates mastery early will move through that level quickly and advance to the next level.

Student actions are tracked throughout a level to allow the system to build a proficiency profile for each student—using a behind-the-scenes metric called the Edgenuity ProScore. With each task students complete, the change in their ProScore is dependent on several factors: the difficulty of the task, the results of each attempt, and the frequency with which students accessed or were delivered instructional supports (e.g., asked for a hint, watched a Show Me video). For example, if a student completes a task correctly on the first attempt with no instructional support, his or her ProScore increases quite a bit. If the student needs some instructional support along the way to complete the task correctly, then his or her ProScore increases, but not as much. Conversely, if the student uses the instructional support for a task and still is unable to complete it, his or her ProScore remains unchanged after that task.

Within each level, if a student's ProScore reaches the proficiency threshold, the student is awarded the appropriate badge and can move on to the next level or topic. If a student's ProScore stagnates or does not increase with sufficient velocity, he or she may be leveled down or even paused so a teacher can take appropriate measures to remediate any issues or misconceptions. Most importantly, because students are assessed continuously as they complete a range of tasks—not just at pretest and post-test moments—UpSmart can deliver just-in-time instruction that gives students what they need at exactly the moment they need it.

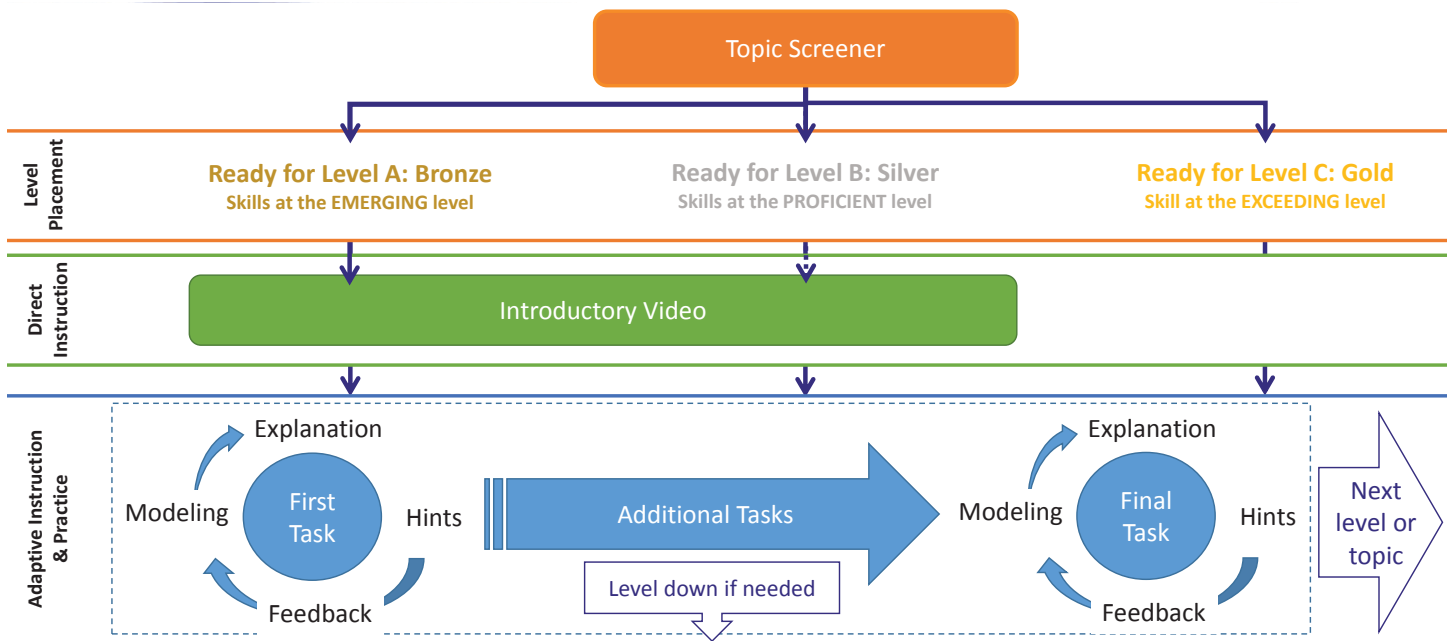
THE STUDENT EXPERIENCE

Across all UpSmart topics, instruction and practice was developed with consideration of common errors and misconceptions that students may encounter in each level. The myriad instructional scaffolds for each task—hints, feedback, Show Me videos, and answer explanations—support skill acquisition through the exploration of these common student misconceptions. The program strives to resolve stumbling blocks at the foundation

Why Can't Students Place Out of Level C?

The goal of the Topic Screener is to determine the most appropriate starting place for each student in as little time as possible. Once it determines that a student is not ready for Level B, for example, the Topic Screener will place students into Level A and then stop. The adaptivity within the level itself takes on the more in-depth work of analyzing whether a student has mastered all the skills in the level. Therefore, the screener's job is to identify Level C as an appropriate starting place. If a student already has a strong command of all the skills in Level C, he or she will move through that level quickly via the adaptivity algorithm within the level.

of learning to ensure that skill acquisition is faster, more conceptually sound, and cohesive with current understanding. This opens the door to the strategic thinking and adaptive reasoning required for college and career readiness.



The UpSmart instructional model adapts to student inputs throughout the topic.

The first instructional experience after a student is placed into a level is an introductory topic video. This video is required for students who place into Level A and is optional for students who place into Level B or C. The video is designed to introduce the concepts and skills students need to be successful in Level A and to help students overcome the most common stumbling blocks associated with the Level A skills.

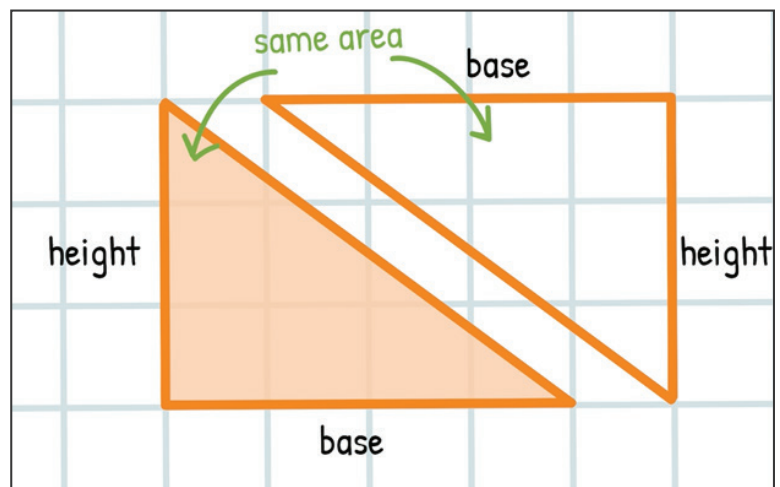
Then students begin a highly adaptive practice set through technology-enhanced tasks that simultaneously assess and reinforce the skills in the level. The first task is designed to reflect a straightforward application of the skill. This task allows the system to assess whether students have mastered the most accessible aspects of the level. As students demonstrate success, they move on to more complex tasks. Likewise, if they do not demonstrate understanding of the more basic skills, instructional scaffolds and additional practice are provided.

Scaffolds for Learning

A variety of scaffolds are available as students progress through each task:

Getting Started: Hints

At any point in the task, students can ask for a hint. The first hint is designed to help students understand what the question is asking. Sometimes, that's all a student needs to solve the problem. However, students can also ask for additional hints that will guide them toward the first step to complete the task successfully.



The introductory video to the Area of Triangles topic provides the conceptual underpinning for why the formula for the area of a triangle is half the formula for the area of a rectangle.

Self-Correcting: Answer-specific Feedback

For each task, feedback is specific to the student’s response. For example, a student whose response shows the classic error of interpreting figurative language as its literal meaning might receive feedback that figurative language often uses a comparison to show something is like something else. A student who computes the area of a triangle as “base times height” might be reminded that she needs to divide by two, since a triangle is half a rectangle. After the answer-specific feedback, students have the chance to try the task again.

Modeling: Show Me Video

If a student answers incorrectly on the second attempt, a brief and engaging Show Me video will guide the student through the task—introducing appropriate strategies, modeling expert thinking, and teaching the student how to approach future tasks about this skill. After the Show Me video, students must complete the task to demonstrate that they can apply the approach that was modeled in the video. If a student views the Show Me video (either because it was triggered by two incorrect responses or because the student asked to see it), the next task will be an “additional practice” task—a new task that is very similar to the original one the student just saw modeled.

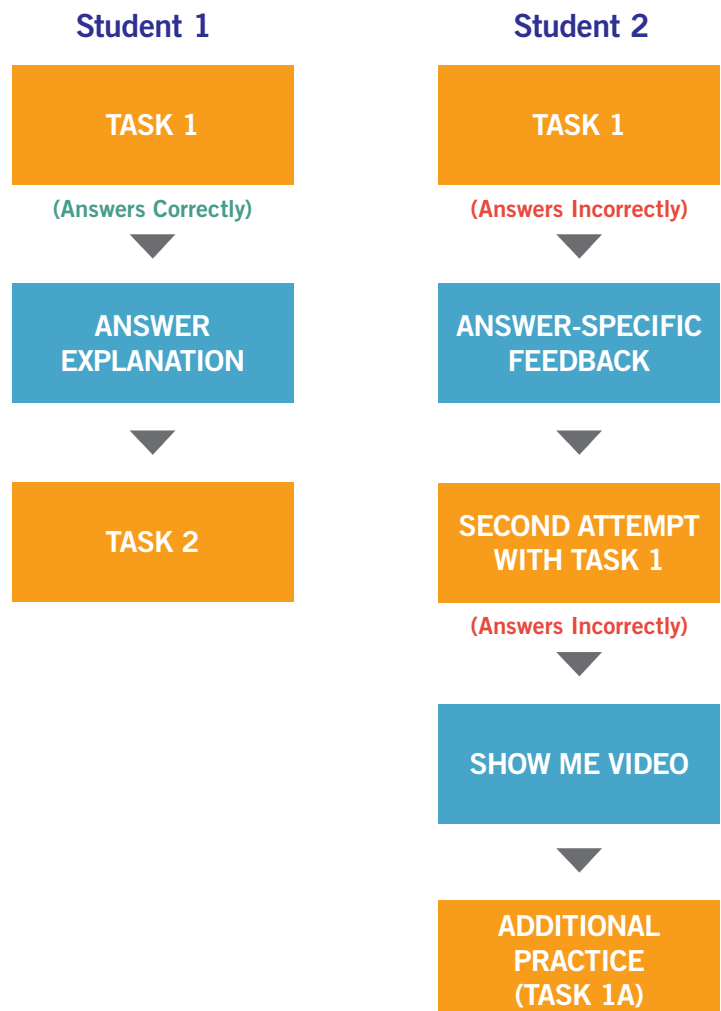
Confirming: Answer Explanation

Once students have completed any task, they can review a written explanation of the answer regardless of whether their responses were correct or incorrect. This can summarize the instruction a student received in the Show Me video or it can simply help a student who might have only understood part of a task to understand a whole procedure.

A PERSONALIZED LEARNING EXPERIENCE

Consider two students who experience a task in UpSmart. Student 1 demonstrates mastery. He may ask for a hint or two along the way, but he is able to progress successfully through the task. This student receives confirmation and an answer explanation, and then advances to the next task in the sequence. Student 2, however, does not demonstrate mastery. For Student 2, answer-specific feedback is provided. Then Student 2 has an opportunity to self-correct. If the student answers incorrectly a second time, UpSmart has learned that he or she needs help with this skill and an instructional Show Me video is triggered.

For Student 2, the task served as assessment and instruction. Now additional practice is needed. Instead of the second task Student 1 received, Student 2 receives a second task that is very similar to the first one (“Task 1a” in the figure to the right). This allows for an assessment of whether the student learned the skill from the feedback and instruction that was provided in the previous task. If the student is successful in the task, he will advance to the next in the sequence. If not, he will be prompted to review the instruction first before advancing to the next task.



This adaptive instructional flow continues as UpSmart accumulates data about the student’s developing understanding of the skills in the level. A student who completes tasks successfully and asks for no hints will move through the level quickly. A student who completes tasks successfully with support (e.g., hints and/or some corrective feedback) will be given more tasks to provide additional practice. A student who continually struggles with tasks will be given direct instruction and additional practice to provide sufficient support toward mastery. If, after this system intervention, UpSmart determines that the student will not move through the level with success, the student will be paused and the teacher will be alerted to provide additional support.

ADDITIONAL ELEMENTS OF THE LEARNING EXPERIENCE

Two additional elements of UpSmart help students meet the rigor of state standards:

Written Responses

In ELA, Level C (gold) often requires students to respond in writing to a text they have read. These constructed-response items require higher-level thinking, as well as the ability to marshal textual evidence to support a claim about a text. An intuitive rubric-based interface allows teachers to review and score these tasks—and to provide specific feedback to students about how to revise and improve their answers.

Sample Prompts

- How does including Charlie in the play help reveal Ramón’s character? Write one paragraph, using key details from the text to support your response.
- Reread paragraph 4 of the passage. What is the author’s central idea in this paragraph? Use two details from the passage to support and explain your answer.
- In the section “Discoveries,” the author describes new information about Mars that the Curiosity uncovered on its mission. In one paragraph, explain what the author shows about these discoveries through the use of specific text elements.

Challenges

The world-class standards movement emphasizes that standards mastery involves the ability to apply multiple skills and standards to solve complex problems and tasks. The PARCC and SBAC assessments test specific combinations of standards together, as published in PARCC Evidence Statement Tables, PARCC Evidence Tables, and SBAC Claims and Targets documentation. As students complete specific combinations of topics, they unlock challenge tasks that combine those topics. These multi-part tasks require students to apply multiple related skills from across different topics, reinforcing coherence across the grade.

IMPLEMENTATION

UpSmart has a number of ideal implementation models.

Alongside the Core Curriculum throughout the Year

The topics in UpSmart can be reordered and assigned based on a school's pacing calendar, allowing teachers to integrate UpSmart seamlessly with their core instruction. Once students have been introduced to skills in their math and ELA classroom via core instruction, they can practice, reinforce, strengthen, and extend those skills in UpSmart. Simultaneously, teachers can monitor student proficiency and provide targeted remediation, re-teaching, and exploration where needed, allowing UpSmart to play a pivotal role in either a traditional or blended-learning instructional model.

Intensive Preparation before a High-Stakes Test

Students preparing for end-of-year interim assessments can use UpSmart to review and practice skills they have learned throughout the school year. Teachers can use interim assessment data to prioritize specific topics for a class, a group, or for individual students. Program settings can be configured to allow students to progress through topics without completing Level C—giving students a chance to prioritize the most frequently assessed skills across all topics before returning to the more advanced skills.

Curriculum for an After-School Program

UpSmart is an ideal tool for after-school or Saturday programs, providing an engaging complement to students' core instruction during the school day. As students level up through topics and earn badges and trophies within the system, teachers can use leaderboards and incentives to keep students advancing through the program. They can also use the data in UpSmart's educator-facing reports to target individual students and small groups for face-to-face instruction on specific skills.



Badges and Trophies in UpSmart

As students master skills in UpSmart, they earn badges that show their growth within a topic. Students can earn the bronze version of a badge and then “level up” in the topic by mastering more advanced skills and earning the silver and gold badges. Students can also earn trophies as they unlock and tackle challenges—optional, more difficult tasks that require students to apply multiple skills in concert. By making explicit the connection between the work students do and the badges and trophies they earn, UpSmart helps students own their personal growth and development. Badges can also help drive classroom celebrations and keep students motivated throughout the program.

