2025

FAQ

XQ Math Badging

(This FAQ contains links to Math Badging Resource Zone documents)

Introduction

What is XQ Math Badging?

The XQ Math Badging System (XQ MBS) comprises 23 individual badges, each representing a set of core mathematical concepts and practices. Each badge is bigger than a standard but smaller than a full traditional math course. Educators can expect to complete 4-6 badges over the course of a year.

Why was XQ Math Badging created?

We created the XQ Math Badging System to:

- Give schools and systems building blocks to create more flexible math pathways that better connect student learning to their interests and career opportunities
- Reduce high recidivism rates by allowing students to certify their learning at the badge level, ensuring they don't repeat content they've already mastered and can focus on new or revisited concepts until mastery
- Provide an alternative credentialing mechanism to certify learning gained through a broad range of sources (coursework, independent study, summer school, etc.), not simply linked to seat time

How does XQ Math Badging work?

At the beginning of each badge in the XQ Math Badging System (XQ MBS), a pre-task is administered to assess students' baseline knowledge. Throughout badge instruction, students should engage in rich, relevant, and real-world learning experiences that develop the badge's main concepts and skills and compile a portfolio of work with reflections on how their work demonstrates learning and growth. At the end of the badge, a post-task is administered to measure student learning, as well as performance tasks for the math badges including an explicit focus on mathematical modeling. Collectively, these assessment instruments are used to gauge student mastery of the badge content. (See more detail on the different forms of badge assessments below.) Badges are designed to be implemented in a flexible manner, but an anticipated time span of 4 to 6 weeks per badge can generally be expected.

How does badging support students and their learning?

The XQ Math Badging System (XQ MBS) reimagines the possibilities for students in high school math. The system anchors mathematics in real-world application and prevents math gatekeeping. Educators implementing XQ Math Badging provide learning opportunities designed with students at the center. This is highlighted through the XQ MBS Design Principles:

- **Every student in every community:** All students deserve the chance to see themselves as capable and confident math thinkers.

- **Relevance and connections:** These badge frameworks are designed to focus on content with practical uses.
- **Depth and coherence:** These badge frameworks emphasize instruction in key concepts with adequate depth and meaningful connections across mathematical ideas, where coherence is established through applicable topics.
- **Flexibility and choice:** The framework is designed to encourage a varied ecosystem of instructional options (independent, group work, project-based learning, etc.) for educators to consider and ultimately, for students to choose.
- **Action-oriented:** To easily facilitate content development, each badge includes concrete examples and sample learning activities.

How do math badges align with state math standards and assessments?

Math badges are designed to align with widely adopted college- and career-readiness math standards, including the Common Core State Standards (CCSS) and similar state-specific frameworks. Each badge is grounded in key mathematical content and practices that reflect the rigor, coherence, and depth found in these standards. Because state standards and assessments vary, our partner states have completed their own alignment process to map badges directly to their local standards and/or adopted curricula. The badge framework adaptability allows for flexible use across a wide range of instructional settings and curricular contexts, while maintaining alignment with core mathematical standards and practices.

Planning for XQ Math Badging Instruction

How do I get started?

We recommend the following steps and considerations for educators new to badging:

1. Get to know the XQ Math Badging System (XQ MBS):
    a. Begin by selecting the badge most related to the content you will be teaching.
    b. Explore the badge materials: Learning Principles (LPs), Content and Practice Expectations (CPEs), and sample learning experiences.
2. Consider the instructional resources you plan to use:
    a. Are you adopting the XQ Math Algebra 1 curriculum? If so, each module provides full coverage of the CPEs for the aligned badge.
    b. Are you using Illustrative Math? We've provided an Illustrative Math Curriculum Alignment tool to provide guidance on which elements emphasize or modify in order to align to the XQ MBS.
    c. Will you be using another third-party, teacher-created, or other customized curriculum? The Curriculum Alignment Template is a planning tool designed to help educators align their existing instructional materials to badge expectations. Whether you're using a district-adopted curriculum or creating your own lessons, this template makes it easy to identify natural connections between your

current units and the badge's CPEs. It also supports reflection on where to amplify learning opportunities, adjust pacing, and incorporate learning principles.

3. Familiarize yourself with the range of assessments that are available to support formative feedback for each badge and help with determinations about badge completion. These include:
    a. Pre-/post-badge tasks
    b. Performance tasks (for modeling badges)
    c. Curriculum-embedded tasks that may become part of students' portfolios
4. Collaborate with other teachers and leaders in your school and local professional learning community to determine how you want to set up badge awarding. This may include simple spreadsheets or more formal credentialing systems; no matter what you do, tracking completion of badges is key.
5. Determine how you wish to communicate the badging program with students and families/caregivers.

You may have access to a local community of practice, but you are also encouraged to participate in the Math Badging online community of educators on Facebook.

What are the Math Badging Learning Principles (LPs)?

Each badge framework is grounded in a set of Learning Principles (LPs) that serve as a foundation for designing student learning activities that help them meet the Content and Practice Expectations (CPEs) for the badge. These Learning Principles should guide the creation—or alignment and adaptation—of instructional materials for badges. All badge-related content engages students in experiences that reflect and are supported by LPs. In each learning activity, students should:

- Engage with cognitively demanding tasks in heterogeneous settings (LP 1).
- Engage in social activities (LP 2).
- Build conceptual understanding through reasoning (LP 3).
- Have agency in their learning (LP 4).
- View mathematics as a human endeavor across centuries (LP 5).
- See mathematics as relevant (LP 6).
- Employ technology as a tool for problem-solving and understanding (LP 7).

For a more detailed description of XQ Learning Principles, view our XQ Learning Principles Design Guidance.

What is an example of the Learning Principles (LPs) in practice?

To see an illustration of an activity aligned to the LPs, let's look at the example below, Designing a Fitness App, which is aligned with Badge M100: Quantitative Reasoning.

Example - Excerpt from activity: Designing a Fitness App – Badge 100

Your school is sponsoring a walk-a-thon to raise funds for a new computer lab. You have been asked to work with an app developer to create a new fitness app for participants to use before, during, and after the walk-a-thon. The app developer needs you to complete the following tasks before the actual programming for the app can begin:

- Draft a flowchart which outlines how a fitness app will work for the walk-a-thon.
- Design a table which organizes key quantities of interest for a walk-a-thon participant using your favorite tech tool.
- Finalize a flowchart with all the features the app should include. Note: A flowchart is a picture of the separate steps of a process in sequential order. It is a generic tool that can be adapted for a wide variety of purposes, and can be used to describe various processes, such as a manufacturing process or a project plan.

In this example activity, students make sense and organize the steps of the task, explore existing fitness apps, draft the flow of their own app, design a table, and draft a revision of the app flowchart for a client.

This activity aligns with the XQ Learning Principles because students:

- Are given a cognitively demanding task. This activity asks students to develop a conceptual model for an app that utilizes user data as the basis of mathematical computations for the purposes of predicting quantities of interest (LP 1).
- Interact socially to share and discuss their work with each other. Interaction may happen live in a physical classroom or asynchronously in a remote setting (LP 2).
- Deepen their understanding of how to identify key quantities and the mathematical relationships needed to make useful models for fitness choices (LP 3).
- Explore areas of interest and potential future aspirations, as they consider the work of programmers, developers, and architects (LP 4).
- Develop an appreciation of mathematics as a human endeavor through the application of ratio reasoning as it is used to make fitness choices (LP 5).
- Engage with mathematics in ways that authentically involve real-world situations and develop a conceptual model for a fitness app (LP 6).
- Use technology as a tool, as they use computational aids such as software or calculators to aid in making calculations (LP 7).

For more details on LPs, this example, and more - visit the Badge M100: Quantitative Reasoning. Each Badge has its own “record” in the Math Badging Resource Zone with links to resources and examples specific to that badge.

How can teachers design or adapt instructional materials to align with badges?

The Curriculum Alignment Template is a planning tool designed to help educators adapt their existing instructional materials to align with badge expectations. Whether you're using a district-adopted curriculum or creating your own lessons, this template makes it easy to identify natural connections between your current units and the Content and Practice Expectations (CPEs) for each badge. It also supports reflection on where to amplify learning opportunities, adjust pacing, and incorporate learning principles. By using this tool, teachers can seamlessly integrate badges into a variety of curricula while maintaining flexibility and instructional coherence.

Math Badging Assessment

How does XQ Math Badging assessment work?

The XQ Math Badging System (XQ MBS) and Learning Principles (LPs) are designed to ensure that every student who attempts a badge will ultimately earn it. This approach replaces traditional systems of math instruction and assessment with a student-centered model that promotes growth, voice, and agency throughout the experience.

Badging offers a flexible vehicle for students to demonstrate their understanding of the knowledge and skills outlined by each badge's Content and Practice Expectations (CPEs). Each badge framework describes the overarching goals, CPEs, and cognitive complexity levels targeted by the badge.

In addition, the Math Badging Resource Zone (MBRZ) contains instruction and evaluation resources, including guidance on developing Portfolios of Evidence with students, Performance Tasks (for modeling badges), and Pre-/Post-Tasks to be administered at the beginning and end of the badge. Annotated student work is provided for select assessment resources.

Together, these resources can be used to gather evidence of student learning that teachers can use to determine whether students should receive a badge. Teachers are encouraged to flexibly integrate evidence from multiple sources to determine whether students have provided sufficient evidence that they have fully mastered the CPEs for each badge. Learn more about XQ Math Badging assessment.

What are Pre-/Post-Tasks?

Pre-/Post-Tasks offer students and teachers a way to identify the knowledge students bring into a new badge and to recognize the growth in understanding that has occurred through badge learning experiences.

Pre-/Post-Tasks should be administered to students before beginning instruction on a new badge and again once badge instruction is coming to a close. At the start of the badge, these tasks are designed to support teachers in making relevant, timely decisions about badge instruction and to signal to students what knowledge they bring to the badge and what they need to learn. At the end of the badge, they are designed to help students see what they have learned during math badge instruction. Along with other evidence, they can help teachers make a summative determination of whether students should be awarded a badge.

We recommend use of these tasks to inform instruction and in service of preparing students for showcasing their learning through Portfolios. They are not designed to be used in lieu of Portfolios, nor are they designed to give sufficient evidence of mastery on their own.

What is a Portfolio of Evidence?

A Portfolio of Evidence consists of a set of student-produced artifacts. These artifacts are collected from student work generated throughout the badging activities. Students should choose artifacts that make them proud and demonstrate their learning in multiple ways.

The portfolio development process includes the following steps:

- Students select artifacts and document their reflections on how that work reflects their understanding of one or more badge CPEs.
- Teachers review the student work and associated reflections and indicate whether it meets the performance expectations for the badge CPEs or whether it requires revision.
- Students iterate, reflect, and revise artifacts and reflections further through student-teacher conferencing until their work meets the performance expectations for the badge CPEs.

Portfolios may be collected in a binder system of student work, an LMS platform highlighting activities and student evidence of learning, or Google Slides and PowerPoint presentations curated by students. In the past, Math Badging educators have worked with students to collect artifacts through a range of media and technology, including:

- Worksheets showing multiple strategies to solve a problem
- Student-created graphs or charts using real-world data
- Video explanations where students talk through their reasoning
- Reflection journal entries explaining how students overcame a math misconception
- Group project deliverables, like a scale model or budget plan
- Presentations on how math applies to a career or issue they care about, aligned to badge Content and Practice Expectations (CPEs)

Why does the badging framework utilize portfolios?

A student portfolio provides evidence that students have met the expectations for a badge over time. Unlike traditional tests, portfolios give students autonomy and agency in how they showcase their learning. The process encourages reflection, allowing students to use their work to tell a meaningful story of growth throughout the badging framework. This not only deepens their understanding but also helps them develop essential skills such as self-assessment, critical thinking, and the ability to communicate their learning journey. These transferable skills are vital for lifelong learning and success beyond the classroom.

What are essential components of a Portfolio of Evidence?

A Portfolio of Evidence is compiled for each badge and should include a compilation of student work and reflections on how that work demonstrates understanding of the badge Content and Practice Expectations (CPEs).

Students will likely find it helpful for teachers to provide some guidance on which tasks or activities are likely to be the source of evidence for their portfolios (see sample "cover page"). They may elect to draw on the content they produced through performance tasks and post-tasks. Teachers can also allow for student choice and agency around the format of responses to include in the portfolio; for example, teachers may encourage students to use video or audio recorded responses.

Teacher Feedback

How can educators provide effective and useful feedback during the badging process?

Teachers should provide students with meaningful feedback on components of their portfolio. The XQ Math Badging Framework uses three categories to describe student work submitted for consideration within a badge. These levels guide how feedback is provided and whether revisions are needed. The levels are:

Conference and Provide Revision Support	Accept with Revision	Accept
The student's artifact shows evidence of an emerging understanding of the targeted expectation(s). After conferencing and additional instruction/learning, the student may provide a revised or different artifact as evidence of their learning.	The student's artifact shows evidence of approaching a full understanding of the targeted expectation(s). The artifact may contain execution errors that should be corrected in revision. The student may revise the selected artifact or submit a different artifact.	The student's artifact demonstrates evidence that they have met the targeted expectation(s).

Feedback for Accept: The student response should demonstrate conceptual understanding and procedural fluency. Educator feedback should highlight what the student understands and how their demonstration shows mastery of the content. For example:

Accepted

You clearly explained why you believe that the relationship between the quantities you chose to track will be linear. Your table displays how you were able to create a function that models the linear relationship between scoops of ice cream and the cost of the ice cream.

Feedback for Accept with Revision: The student response may have minor errors or could benefit from a deeper display of conceptual understanding.

Educator feedback should highlight what the students understand, while asking probing questions that push students to review their work without providing them with the solution. As an example:

Accept with Revision

I notice that

- You correctly identified a context that fits the equation.
- You correctly defined the variable within this chosen context.
- You correctly reasoned that the expressions being set equal would help us compare the prices.
- In the last two parts your answer helps us compare the price of buying one sauce, but doesn't actually represent a true equation (i.e. 0.75 is NOT equal to 1.25).

I wonder…

- What is meant by the "solution" of an equation, especially in this context?
- Once you find the solution that makes the left and right sides of the equation equal, what does that mean in this context? Will your chosen context still make sense?
- How could you use the information from the graph to find the solution, then compare that result to the solution you identified here?

Feedback for Conference and Provide Revision Support: The student response may have mathematical errors and/or demonstrate a need for developing a stronger conceptual understanding of the topic.

The educator feedback should highlight what the student understands and ask probing questions to determine where they have misconceptions. The educator should reengage the student in learning around the topic, whether through written feedback, 1:1 support, etc. An example of feedback for "conference and provide revision support":

Conference and Provide Revision Support

Part a:

The table and the graph are well aligned. The graph shows a curve that models the situation well. I would like to know more about how you obtained d(meters) or outputs in the table. How could the graph also show where the exact points are located on the curve?

Part b:

Your explanation on whether the water bottle is falling at a constant speed talks about the curve being non-linear and why. The part about the curve being exponential is confusing to me and I would like to know more about your thinking on that decision.

What is a Performance Task?

For badges with a deeper emphasis on mathematical modeling (recognizable as they have “modeling” in the badge title), students are expected to complete a performance task in addition to developing a portfolio.

Performance tasks ask students to engage in mathematical modeling in authentic, real-world contexts. Students report their conclusions using media suited to the overall purpose of each task and have some agency in the selection of their preferred media (e.g., presentations, videos, reports).

XQ provides a series of performance tasks that have been tested with a range of students in partner states. The teacher guides for these performance tasks include sample student work with annotations that can help teachers understand the expectations of student work for these tasks.

Awarding Badges

Who evaluates whether a student has earned a badge?

Using the available forms of evidence (see Math Badging Assessment), classroom teachers take the lead in evaluating whether students earn badges, although, when piloting or adopting badging, schools and/or districts are likely to set some standards or frameworks for how to approach the awarding of badges.

Some teacher teams may use existing professional learning community (PLC) structures or establish PLC structures to collaboratively review and evaluate student work. This team-based approach supports consistency and shared understanding of the expectations.

A district leader may also establish periodic review opportunities for teachers from different schools to share portfolios and engage in a moderation process to support consistent judgements of sufficiency of evidence across schools and teachers.

How do educators equate badge progress to grading?

In schools using competency-based grading, Math Badging shifts the focus from scoring individual assignments to evaluating whether students have demonstrated mastery of the badge CPEs across a range of badging assessments. Math Badging teachers working in more traditional grading systems often adapt by treating portfolio pieces as individual assignments (which they enter into gradebooks) or by using pass/fail options. Whatever the grading model, clear communication between teachers, students, and families is essential. All stakeholders should have the same understanding of what grades represent and how they reflect student learning, mastery, and future opportunities.

What systems or tools do teachers use to student progress and badge completion?

Many teachers use their school’s learning management system (LMS) to track student progress. Within the LMS, they create assignments where students submit links to their electronic portfolios, often via Google Slides or similar systems to allow students to draft, revise, and submit their portfolios.