



XQ MATH BADGING SYSTEM

Implementation Guide for District Leaders

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Prepared for the XQ Institute by the Center for Assessment



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The XQ Institute is a nonprofit organization and independent affiliate of Emerson Collective founded in 2015. We work closely with students, families, educators, and district leaders to turn their ideas into action. XQ also has developed a suite of free, high-quality tools and resources that help bridge the gap between vision and practice. In addition, XQ engages in research and analysis to identify policies that support meaningful transformation—and lay the foundation for sustained change.

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XQ MATH BADGING SYSTEM

Implementation Guide for District Leaders



AUDIENCE FOR THIS GUIDE

We appreciate your interest in the [XQ Math Badging System](#) (XQ-MBS).¹ This implementation guide is part of a broader set of implementation resources.

For example, there is an [implementation guide for state leaders](#) as well as resources for teachers to help them develop a robust understanding of badge content expectations, assessment resources, and professional development tools and networks. This guide similarly includes high-level summaries for district leaders that are intended to highlight key ideas related to XQ-MBS and why they might want to get involved.

During the initial piloting of the XQ-MBS, the work was initiated and coordinated at the state level, with both state-level professional learning and support for participating districts and schools, along with local support.

We wrote this guide with a district leader (e.g., a superintendent, a director of curriculum) in mind who is interested in learning about the goals and steps for implementation of the XQ-MBS. However, you will need to do much of the work described in this guide in close collaboration with school leaders and teachers who might implement the program, along with other colleagues.

Moreover, we have written this guide with the assumption that there is a favorable policy environment and available resources that might be dedicated to support this work. These could come from the state education agency or reflect a more local district-led initiative. In the latter case, we recommend that you consult the state leader implementation guide as part of this process as they may have to take on some of the coordination responsibilities.

OVERVIEW OF GUIDE

This guide is designed to help you think through different aspects of the implementation work for the XQ-MBS so that you and your team can set a strategy for program implementation, how to phase the program into existing school programs in your district, and how to continually evaluate and improve the implementation of the XQ-MBS so that it leads to the desired educational changes.

This guide leverages lessons learned from early adopters of the XQ-MBS as well as insights from the design team and its partners. These have been gathered over the last two years of piloting the system in Idaho, Illinois, Kentucky, and the Bureau of Indian Education. Many of the practical resources in this guide were created and shared by these colleagues.

¹ We will sometimes refer to the XQ-MBS as a “program” or “initiative” depending on context.

We have broken down the implementation guide into **four main steps** that correspond to **major activities or actions**: (1) deciding if this program is a good fit for your district, (2) getting ready to launch it, (3) supporting early implementation, and (4) sustaining it in the long term. In our experience, being aware of the requirements for each step at the outset and taking a systemic, long-term perspective is most helpful for successful implementation.

Step 1 - Evaluating Program Fit

In this section, you will learn about the core motivations for implementing the XQ-MBS. These are based on the programmatic goals of the XQ-MBS, the design features of the system, as well as the piloting experiences / priorities by our state partners. You will also learn about important enabling conditions for the XQ-MBS that experience suggests will make for a smoother implementation. You will also learn the value of assembling a strong core advisory team and a broad partner coalition that you can leverage throughout an implementation.

Step 2 - Preparing to Launch the Program

In this section, you will learn about the key steps your team needs to take to prepare for the eventual implementation of the XQ-MBS. These steps are typically conducted in the school year prior to the initial launch. They are necessary to ensure a smooth rollout and to get sufficient buy-in from local school leaders, teachers, families, and community members.

Step 3 - Launching and Improving the Program

In this section, you will learn about the key practical steps that are necessary to continually support the implementation of the XQ-MBS once it has been launched. This includes creating sustainable leadership at your district office and across the participating schools in your district as well as ongoing engagement with teachers, students, parents, and other community members to see what works and what needs improvement. This includes continuing to support the professional development of school leaders and teachers.

Step 4 - Sustaining the Program

In this section you will learn about key strategic actions that are necessary to sustain the XQ-MBS in the long term. This work includes informal and formal evaluations of the program to make the case for positive impact with rigorous, meaningful evidence. It also includes considerations for amplifying the value proposition for the badges through collaboration with local postsecondary partners in community colleges, universities, and/or local businesses.

Roughly speaking, the four steps that we listed above correspond to the timeline shown in Table 1; see also the [Table of Contents](#) for an overview of all actions.

Table 1 Steps and Timeline for Program Implementation

#	Program Step	General Timeline
1	Evaluating Program Fit	At least 1 year before starting the program
2	Preparing to Launch the Program	At least 6 months before starting the program
3	Launching and Improving the Program	During the first year or two of implementation
4	Sustaining the Program	During the subsequent years of implementation

The steps in Table 1 are not quite as linear as the table setup suggests. For example, you will need to continue many of the actions that you take to prepare for the launch of the program once the program is underway in order to incorporate input from school leaders, teachers, students, family members, and external partners. Similarly, you will need to continually monitor the program implementation independently of formal evaluation.

While this guide is written as if all schools in a district are implementing the program at the same time, it is quite likely for larger districts in particular that there may be different implementation cohorts starting the program at different times. We found this to be the case frequently with our pilot partners.

Each of the following sections of this guide is dedicated to one of the four steps that we listed above, with specific actions and component actions. We present these actions as recommendations based on our experiences with our pilot partners and best practices in the field of [implementation science](#), but encourage you to adapt them as necessary to your local contexts and needs.

It is important to document the key decisions in your district, including who was involved at each step, how actions were completed, and which challenges or open questions remain. This helps with leadership transitions and long-term sustainability. We have included various templates in [Appendix B](#) to help with the implementation in each of the four steps and the associated documentation.

Finally, we note that there is a [glossary](#) included in this guide, which defines the major terms we are using or referencing. We generally refrain from using acronyms except XQ-MBS because this is a frequently used term.

STEP 1 - EVALUATING PROGRAM FIT

There are five actions described in this section to help you evaluate whether the XQ-MBS is an appropriate fit for your school district:

- Action 1.1 - Understand the Flexibility of the XQ-MBS
- Action 1.2 - Understand the Educational Goals of the XQ-MBS
- Action 1.3 - Create an Exploratory Advisory Team
- Action 1.4 - Conduct an Initial Screening of Fit
- Action 1.5 - Conduct a Detailed Evaluation of Fit

[Appendix B](#) has templates that will help you document your key steps, reflections, and outcomes as you work through these actions.

These actions represent work that ought to be done in the year before you start the program.

Action 1.1 - Understand the Flexibility of the XQ-MBS

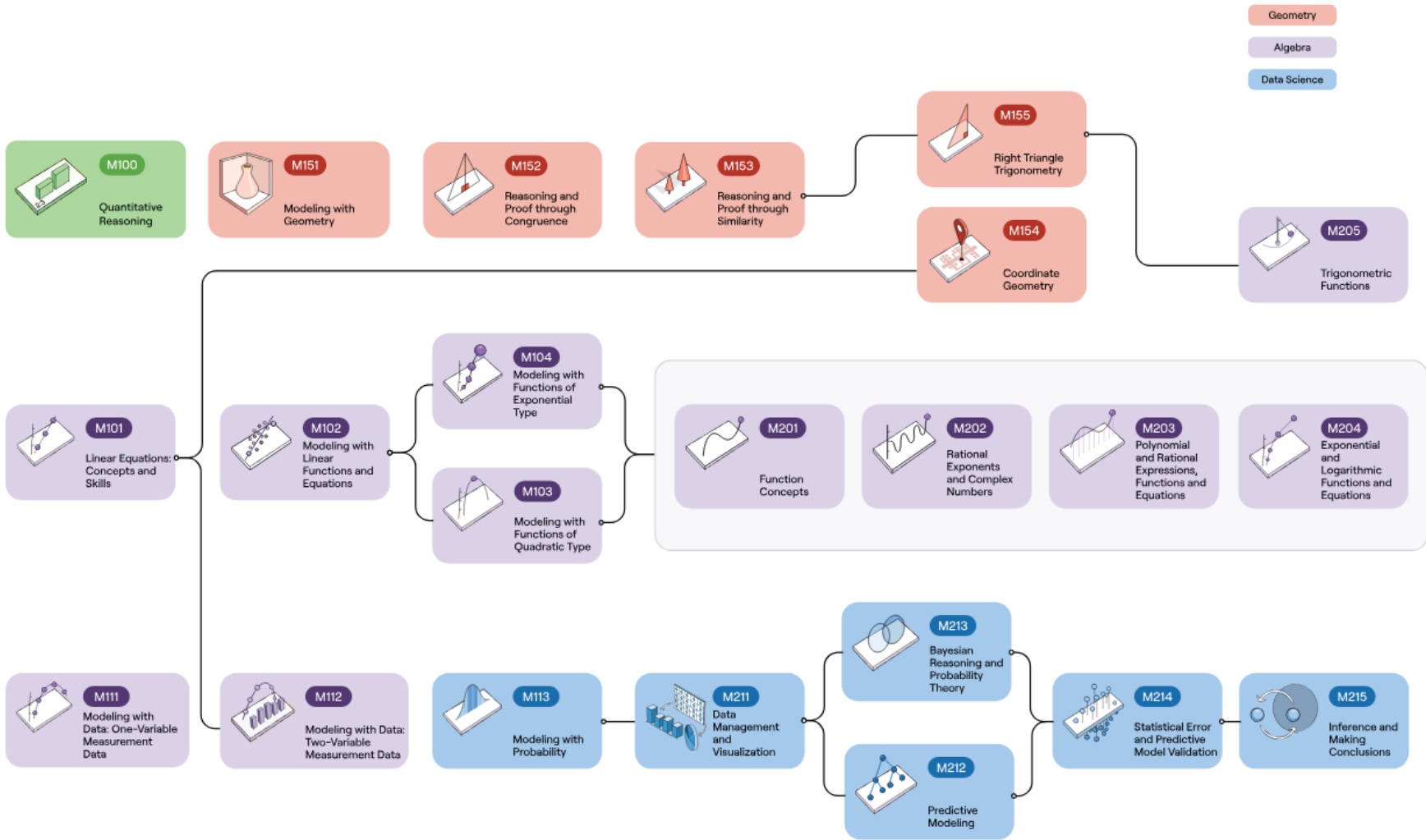
For over a century, the Carnegie Unit has undergirded the architecture of schooling in the United States. In secondary math instruction, this has often meant a common set of year-long courses: Algebra I, Geometry, and Algebra II.

The XQ-MBS provides districts with a **flexible method of certifying learning in smaller components** in contrast to earning a credit for an entire course, thus communicating a sense of accomplishment to students—and to external audiences—earlier in their learning journey.

Put differently, a central educational purpose of the XQ-MBS is to **offer an alternative vision of how math instruction is organized**, breaking mathematics out of this traditional time-bound sequence and **providing students with opportunities to learn that are more modular, relevant, and flexible**.

Badges are organized into pathways. Pathways are composed of badges, not courses, and multiple badges can often be earned within a common course. Some badges are prerequisites for others, while some can be taken simultaneously. Figure 1.1 shows the core pathways between badges in the XQ-MBS. Furthermore, the XQ-MBS is designed with flexibility in terms of how badges are **integrated with curricula**, and how student learning is tracked. Table 1.2 summarizes these various flexible features.

Figure 1.1 Pathways for math badges within the XQ-MBS



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Table 1.2 Areas of Flexibility within the XQ-MBS

Areas of Flexibility	Description
<p>Flexible Badging Pathways</p>	<p>The XQ-MBS is designed around math badges that cover a coherent set of content and practice expectations (CPEs) (i.e., badge-specific standards) that can be aligned with state standards.</p> <p>Badges (e.g., Linear Equations: Concepts and Skills, Modeling with Functions of Exponential Type) can be thought of as standalone recognitions of values that are organized into pathways. Sets of some badges can be integrated into existing high school courses (e.g., Algebra I, Algebra II, Geometry).</p> <p>Students can choose to take one or multiple badges within a given pathway and can cross pathways for different areas of interest if desired. Students can also take multiple badges simultaneously whenever content sequencing allows.</p>
<p>Flexible Curricular Integration</p>	<p>The XQ-MBS does not prescribe a specific set of curricular content for each badge and can be aligned to a variety of mathematics curricula. Similarly, the XQ-MBS is not a curriculum. Instead, it is a framework for designing instruction within a high school mathematics program.</p> <p>Resources within the XQ-MBS contain alignment guidance and an aligned set of project-based learning modules for select badges that can supplement any core curriculum. Curricular alignment work has already been completed for the Illustrative Mathematics curriculum and an open-source XQ-developed math curriculum for select algebraic badges.</p>
<p>Flexible Grading Alignment</p>	<p>The XQ-MBS uses a criterion-referenced, mastery-based approach to learning where formative feedback and the opportunity for revision is emphasized.</p> <p>The XQ-MBS includes resources that support teachers in integrating badges into local grading systems and/or to transform grading practices toward standards-based grading.</p>

Action 1.2 - Understand the Educational Goals of the XQ-MBS

The XQ-MBS might be a valuable program for your district if you have been thinking about the following foundational efforts around mathematics instruction:

1. You are looking for ways to modernize practices of math instruction.

You want to ensure that your students **graduate ready** for a variety of careers in industry, pathways in college, enlistment in the military, or other postsecondary opportunities. You recognize that this requires **modernization** of the ways mathematics is taught in schools, which includes an emphasis on both foundational mathematics skills and applied, authentic problem solving in ways that mirror postsecondary demands. This requires transformations of how students learn and teachers educate.

XQ-MBS **encourages teachers to use learning experiences and tasks that encourage student collaboration, effective use of technology, and the use of open-ended tasks** that do not necessarily have a single correct answer or will rely on a single problem-solving approach.

2. You want to increase student engagement in mathematics classrooms.

You want to fundamentally change how students experience math in the classroom. You want to increase **students' abilities to make choices** about important aspects of their learning **without sacrificing rigorous instruction**. This may include the design of their portfolios or the topics that they choose for their work and the tools that they use to collaborate with peers or community members on projects.

The XQ-MBS encourages teachers to provide various **opportunities for students to participate in the learning process**, whether through selecting who to work with, exercising choice in the ways in which they will demonstrate their learning, or by inviting them to identify projects that are relevant both to them and to the mathematics being learned.

3. You want to underscore the importance of mathematics in the real world.

You want to provide flexible, rich evidence of mathematics learning in **contexts that matter**. This includes allowing students to learn math in interdisciplinary settings within relevant areas of today's workforce, both in school and in out-of-school contexts. The tasks that students complete should require a **strong emphasis on modeling practices and applied, authentic work** in addition to foundational work on the necessary enabling knowledge and skills.

XQ-MBS encourages teachers to use learning experiences and tasks that help students apply mathematics to authentic, real-world contexts and problems, potentially in collaboration with local community partners whenever possible.

4. You want to support teachers in modernizing their approach to teaching math.

You want teachers to deepen their own understanding of math and better support student learning. This requires deepening teachers' **math content knowledge** (i.e., their own expertise in critical mathematical areas) as well as **pedagogical content knowledge** (i.e., the knowledge needed to teach math) within a model that provides coherent connections among standards, curriculum, and assessment. You also want to support teachers in effectively providing ongoing formative feedback, assessment, and guidance.

XQ-MBS provides learning resources for teachers to support them develop their expertise with math badging, through foundational and badge-specific learning opportunities.

TIME TO REFLECT

Take some time to reflect in Table S1.1 in Appendix B on how your district is doing in terms of high school math performance and the potential value and relevance of the XQ-MBS for your district. The Appendix is intended to help you capture initial thinking which you can share with others. Steps 1.3 and 1.4 will take you into a more complete review of the program and resources.

Should you decide to move forward with math badging, the remainder of this guide will walk you through the necessary decisions about resources, professional learning and getting started with the work.

Action 1.3 - Create an Exploratory Advisory Team

If you have determined that the XQ-MBS could be a good fit for your district, it is time to form an exploratory advisory team. The advisory team can remain relatively small while including colleagues with relevant complementary areas of expertise, such as the math curriculum director, professional learning director, one or two high school math teacher leaders. You could also include a member of your local school board so they are involved in initial discussions and can advocate for the program later in the process as you may seek policy changes or funding.

You may be aware of a math or STEM advisory team that, in fact, already exists in your district, in which case this action may be more about reviewing its composition and integrating the program into its body of work. The next subsection and actions walk through this initial evaluation process for your team.

You may want to share your reflections from Action 1.1 with this group or engage them in a discussion of that section as a way of engaging them in this project.

Action 1.4 - Conduct an Initial Evaluation of Fit

At this point you want to engage your advisory team in a review of the [XQ-MBS Content Frameworks](#) as well as the resources associated with a sample badge. Note that Action 1.5 is a more detailed examination of fit, while this review step is more cursory to establish an initial sense of whether the program would be relevant to your district.

TIME TO REFLECT

Take some time to reflect in Table S1.2 in Appendix B on the specific parts of the XQ-MBS Content Frameworks described in Table 1.3 below.

Table 1.3 Sections of the XQ-MBS Content Framework to Review with Discussion Questions

Framework Section to Review	What it is	Questions to Discuss with Your Advisory Team
Learning Principles	<p>The XQ-MBS learning principles were developed by XQ and its partners based on modern conceptions and empirical research around teaching and learning mathematics grounded in the learning sciences and neighboring scientific disciplines.</p> <p>They represent a high-level, ambitious view of what 21st-century mathematics learning can look like.</p>	<ul style="list-style-type: none">• What aspects of the vision of learning math encapsulated by these learning principles are particularly compelling to you?• What other local efforts to transform mathematics instruction or high school instruction more generally do they align with?• What aspects of the learning goals might be more of a challenge or in conflict with teaching and learning practices in your district?

Framework Section to Review	What it is	Questions to Discuss with Your Advisory Team
Badge Catalog	<p>In the XQ-MBS, there are currently 23 mathematics badges, which can be grouped in various ways depending on your course structures and your ultimate implementation plan.</p> <p>The graphic Figure 1.1 shows the key relationships between the badges.</p> <p>For example, in Kentucky, badges M101-M104 were incorporated into an Algebra I course, while in Idaho badges M201-M204 were incorporated into a rigorous Algebra II alternative course.</p> <p>Multiple badges could be integrated into interdisciplinary courses (e.g., M151 in a CTE course) or common advanced courses (e.g., some of M111-M113, M211-M215 in an advanced data science course).</p>	<p>As a district leader, you do not need to make any hard and fast decisions at this point but consider what might be relevant in your district:</p> <ul style="list-style-type: none"> • Which individual badges do you think would be of interest for your students given your current course offerings? • Which badge pathways do you think would be of interest for your students, given your current course offerings? • Are there certain student groups that might benefit particularly strongly from having an individual badge or badge pathway offered?
Badge Frameworks	<p>This section describes for each badge:</p> <ul style="list-style-type: none"> • The core CPEs and kinds of activities that would demonstrate evidence for each CPE • The points of emphasis in each badge • How the badge employs the XQ learning principles 	<p>We recommend that your advisory team pick one or two badges that would likely be of most relevance to your district to discuss:</p> <ul style="list-style-type: none"> • Which courses with their associated standards align well with the CPEs as well as the indicators for these badges? • Which opportunities exist for allowing the completion of the badges across different courses instead of a single course?

At this point in the process, your advisory team is hopefully still convinced that the XQ-MBS is a good fit for your district and have documented initial reactions in Table S1.2 in Appendix B. If so, they should think through a few core implementation conditions next in Action 1.5.

Action 1.5 - Conduct a Detailed Evaluation of Fit

Next it is time to leverage your advisory team to think through key conditions that will make it easier for you to implement and sustain the XQ-MBS in the long run.

TIME TO REFLECT

Take some time to reflect in Table S1.3 in Appendix B on the conditions identified in Table 1.4. None of these conditions should be considered as “exist/don’t exist” but, rather, as existing along a continuum.

Table 1.4 Conditions That Will Support Implementation of XQ-MBS

Conditions	Elaborations/Considerations
Favorable policy conditions	<p>The XQ-MBS works in ways that echo core educational approaches or systems, so policies that support such initiatives will similarly support badging.</p> <p>For example, are you already cultivating initiatives related to mastery or competency-based education (CBE) in your district or is your state supporting these? Has your district been implementing or working toward standards-based grading? Is there flexibility in your graduation requirements, supporting mastery-based demonstrations of knowledge over seat time?</p>
Opportunities for learning and sharing among educators	<p>Whenever some teachers are excited to take on this new initiative and to provide leadership to others, there is a much greater chance that work with the XQ-MBS will take hold in the long term.</p> <p>For example, do you have a potential coalition of teacher leaders who are willing to try new things and showcase their work to others? Are teachers eager to share new learning with colleagues? Do teachers respond well to hearing new ideas from their peers?</p>
Efforts to help teachers focus on students' strengths	<p>Implementing the XQ-MBS will require that teachers analyze student work to identify evidence of learning (i.e., what students can already do, to build on that understanding to help students move to the next stage of learning), rather than focusing on skill “gaps” or applying traditional grades and rubrics.</p> <p>For example, is it a common practice for students to be able to resubmit key work until they master relevant expectations? Are school communities showcasing and celebrating student learning and successes in fairs, exhibits, or other settings, ideally with families and community members?</p>

Conditions	Elaborations/Considerations
<p>Supports for professional learning</p>	<p>Having regular venues and schedules to convene teachers and provide support will be necessary for educators to understand badge expectations and prepare to teach in new ways.</p> <p>For example, Is there time allocated to department meetings or other regular math-focused professional development that could be used to support the implementation of the XQ-MBS? Are there instructional coaches or teacher leaders who could support initial implementation?</p>
<p>Flexibility in your grading policies</p>	<p>Implementing the XQ-MBS will require changing the way that teachers interpret student work, input grades, and report on student learning to families. The more rigid existing grading policies and platforms are, the more challenging it will be to transform educators’ approaches to analyzing student work and reporting progress.</p> <p>For example, in your district, who has the authority to adjust grading policies, procedures, and software? How likely is it that school leaders, teachers, and families would support changes to these practices?</p>
<p>Alignment between curriculum and the core vision of instruction of the program</p>	<p>Implementing the XQ-MBS will require aligning existing (or identifying new) curricular materials to the content of each badge and the vision of teaching and learning described by the learning principles. For example, teachers will need materials that support students’ collaborative problem-solving skills and be able to offer relevant contexts for applying mathematics and opportunities for student reasoning, among other aspects.</p> <p>The closer your current curriculum aligns to this vision, the easier it will be to launch the XQ-MBS. If your curriculum generally does not align with these principles, you will likely need to supplement your existing curriculum by using an existing open-source curriculum aligned to the XQ-MBS or invest some time in adapting or creating materials in line with the vision outlined in the XQ-MBS.</p>
<p>Resources available to support program implementation</p>	<p>The XQ-MBS will require some investment into professional learning experiences for teachers (both at the launch and ongoing), curation of curriculum materials, and possibly other expenditures such as subscribing to a badge management system (depending on your vision).</p> <p>Modern technology can make some parts of these processes relatively easy although they still require some dedicated time and resources. Before embarking on this journey, it is therefore important to consider the resources that are currently available at your district. Note here that experienced educators or strong connections to the community can also be viewed as resources, in addition to any technical or financial resources.</p>

You may wish to add other areas to consider in your discussions to the list above. Through these discussions, your advisory team should develop a recommendation that will help you, as a district leader, decide whether the XQ-MBS is a good fit for your district.

The more questions your advisory team answers positively, or for which they can see solutions with some reasonable adjustments or investments, the smoother the transition to the XQ-MBS will be for everyone involved. However, if your team answers unfavorably to a majority of these questions or has a lot of associated hesitations, you should probably establish more favorable conditions first before proceeding to the launch phase.

Alternatively, you might plan for greater levels of support or a slower roll-out of the XQ-MBS. For example, you might work with a very small team of teachers initially and make clear which district policies or expectations might be set aside while they are piloting the materials.

To support an overall judgment of readiness, we included a XQ District Readiness Self-Assessment in [Appendix B](#). You may find this a helpful resource for your exploratory advisory team to complete individually and discuss or to work through together as a team to identify district strengths that would support this work.

The next section, Step 2 - Preparing to Launch the Program, is about the work that would happen in your district for you to get ready to launch the XQ-MBS, at least in some schools.

STEP 2 - PREPARING TO LAUNCH THE PROGRAM

There are 10 actions described in this section to help you get ready to launch the XQ-MBS in your district:

- Action 2.1 - Establish Your Implementation Team
- Action 2.2 - Bring Along Other Stakeholders
- Action 2.3 - Review Badge-to-Standards Alignment
- Action 2.4 - Review Badge-to-Course Alignment
- Action 2.5 - Review Badge-to-Curriculum Alignment
- Action 2.6 - Review Badge-to-Assessment Alignment
- Action 2.7 - Plan Teacher Professional Development
- Action 2.8 - Review and Adapt Grading Practices
- Action 2.9 - Track and Award Badges
- Action 2.10 - Create a Digital Portfolio Management System

Appendix B has templates that will help you document your key steps, reflections, and outcomes as you work through these actions.

These actions represent work that ought to be done in the six months before you start the program.

This section is first and foremost about all of the preparatory steps that you, as a district leader, will spearhead—in collaboration with an implementation team (likely expanded from your initial advisory team that you created under Action 1.3), school leaders, partner organizations, and other

kinds of collaborators—to get ready to launch the XQ-MBS in your schools. This work typically takes place during the school year prior to the launch but many of the preparatory steps remain relevant throughout the implementation of the program.

The amount of time the actions in this step take can vary anywhere from a few weeks or months to an entire calendar year. The exact timing will depend on the scope of your implementation and can be modified in partnership with your expanded advisory team (Action 3.1).

Providing consistent, thoughtful, and effective leadership throughout all phases of implementation of the XQ-MBS is essential as educators, students, and families encounter mathematics learning opportunities that may be significantly different from what they have historically experienced. As such, establishing your implementation team and bringing along other potential partners is key.

Action 2.1 - Establish Your Implementation Team

It is very likely helpful to expand your exploratory advisory team to a more formal implementation team at this point. For example, you might consider adding select school leaders and teachers from your district. If you have multiple schools participating, you may want to include a teacher from each school.

You may also consider reaching out to local independent math experts from post-secondary institutions (e.g., math educators in an education department at a local university) to invite to join the team, particularly as you work through decisions about which badges to integrate into math courses (see Action 2.3). If the badging work in your district is part of a larger initiative in your state, you may have access to math experts at the state level rather than needing to engage them exclusively at the district level.

This formal implementation team should meet regularly—perhaps monthly—to think through key implementation steps and to help you keep an eye on important blindspots that may threaten the value of the program or its long-term sustainability.

This group will be able to identify pain-points within and across schools and quickly elevate them to the larger team to be able to problem-solve quickly. This group can also weigh in on the range and timing of communication strategies needed for other stakeholders, which we discuss next.

Action 2.2 - Bring Along Other Potential Stakeholders

Depending on the ways in which you plan on using the badges you may want to also include parents or local industry representatives, employers or local higher education representatives. These can be part of your implementation team or part of a broader group of stakeholders that you convene less frequently, but who can provide tactical support and insights as you expand the work.

It is critical to communicate with teachers—beyond those on the implementation team—and families about the ways that math instruction will change (and not change) as a result of implementing the XQ-MBS. Here are some ideas for what you can do to strengthen the communal buy-in for the XQ-MBS:

- **Host public information sessions** for different groups (e.g., for teachers, for families) to explain how the badges will change the classroom experience for teachers and students
- **Meet with select individuals** (e.g., individual school leaders) to go over information from the XQ-MBS frameworks to help them see the connection between the XQ-MBS and some of the specific local issues that its implementation might help to address

- **Include information about the XQ-MBS in newsletters or in social media posts** to signal an ongoing effort and commitment to the work and hear from other potential partners

These engagement approaches should mirror, or build on, existing engagement approaches in your district. There is no need to invent new, bespoke approaches just for the XQ-MBS. You may need to complete some of the other actions in this step before you feel ready to begin more widespread communications.

Students are a significant interest group for communication about math badging as they are the ones most directly affected by it. As math badging is being rolled out, teachers need to explain to their students why badging matters, how it is related to known practices such as feedback, grading, and course progressions, and set clear expectations for how to earn a badge.

The implementation team, along with all teachers who are planning to participate, should create a core set of unified messaging materials so that all students, no matter what school and classes they attend, receive a common, coherent message about what math badging will entail. The following actions will help to equip teachers with the necessary knowledge to do so.

Action 2.3 - Review Badge-to-Standards Alignment

At this point in the process, you will need to make a high-level decision about how the badges will align to high school mathematics standards. For example, in Table 2.1 you can see how a district in Illinois aligned the CPEs for the M101 badge with the Illinois Standards for Math first. They then provided examples of resources that the teachers in this school could draw on as curriculum supplemental resources, which we discuss in Action 2.5.

If you are doing this on your own, within your district, identify a team of specialists with relevant content expertise, who are ideally already part of your formal implementation team - we will refer to them as the 'alignment review team' in the following.

If you do not have access to such a team, identify other members who could be brought in for this alignment work. Create or review crosswalks between badges and standards that can be shared with participating schools and teachers.

However, depending on your circumstance, you may not need to do this work alone. For example:

- If the badging work in your district is part of a larger initiative in your state, this work may be done across districts and coordinated by content experts within the state education agency. You may have the opportunity for some of the lead teachers and math coordinators in your district to contribute to this alignment work.
- If your district is joining the XQ-MBS later than other districts in your state, this work may already have been completed, and this step is mostly about reviewing and understanding the alignment.

Next you will have to determine the alignment of math badges to courses.

Action 2.4 - Review Badge-to-Course Alignment

Teachers will need to clearly understand which badges are relevant during which courses and whether there are multiple badges to be covered with a course or across courses. Given the close relation to courses and standards, Action 2.4 may take place in conjunction with Action 2.3 or even before Action 2.3. Moreover, the team supporting Action 2.3 can also support this action - the implementation team in particular may already have a strong sense of which badges to begin with.

Table 2.1 Example Mapping of M101 CPEs to Illinois Math Standards and Instructional Resources

Content and Practice Expectations	Indicators: Choose an artifact where you...	Illinois Learning Standards for Math	Examples of artifacts (IXL)	Examples of artifacts (Desmos)	Examples of artifacts (Worksheets/ Notes)	Video Resources
101 a: Reason about and solve one-variable equations and inequalities	i. use variables to represent numbers and write expressions when solving a real-world or mathematical problem	A-CED	IXL Alg1 I.5 - Write variable equations	Desmos Activity - Guess my Rule	Translating English to Algebra	Video - Translating English to Algebra
101 a: Reason about and solve one-variable equations and inequalities	ii. demonstrate understanding that a variable can represent an unknown number or, depending on the purpose at hand, any number in a specified set.	A-SSE	IXL 8th Y.1 - Which x satisfies an equation? AND IXL Alg1 K.3 - Identify Solutions to Inequalities	Desmos Activity - Inequalities on the Number Line	Variables & Expressions	Video - Variables & Expressions
101 b: Solve real-life and mathematical word problems using linear expressions, equations, and inequalities	i. solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form while using tools strategically.	A-APR	IXL 8th X.4 - Write Variable Expressions: Word Problems	Desmos Activity - Central Park	Stained Glass	None available

Similar to Action 2.3, this alignment work might be coordinated at the state agency level with an opportunity for your district to participate. If it has been completed already, then this step is less about determining the alignment, and more about reviewing and understanding the alignment.

Math I or Algebra I are common places to begin implementation as these courses are foundational to high school and postsecondary mathematics. Many students in these courses, especially those from historically marginalized groups, often fail and have to repeat a course.

Allowing students to experience badges at the Algebra I or Math I level thus offers a distinct opportunity to position mathematics as an exciting discipline early in high school, to change the trajectory of students' mathematical experiences in high school and beyond, and to be a driving force for allowing all students to succeed in math.

Mapping badges to existing math courses is not the only way to begin implementation, however. You could offer select badges as part of interdisciplinary courses (e.g., as part of courses or course sequences in construction, data-based policy science or social justice, game development, urban engineering).

You could also assign badge work via independent study for advanced learners or struggling learners who need to make up some, but not all of the skills, for a course (i.e., for credit recovery). Technically, you could even consider creating new courses aligned to single or multiple badges although this would require a more significant investment of resources.

Action 2.5 - Review Badge-to-Curriculum Alignment

Now that your alignment review team has completed an initial mapping of badges to standards and courses, it is important for them to do a more detailed analysis of high-quality instructional materials to be able to understand where there is overlap and where there are gaps in terms of learning supports for the badge content.

There are essentially three options, which can be combined, for the curricular materials:

- **Align existing curricular materials** with the XQ-MBS
- **Adopt freely available curricula** that are already aligned with the XQ-MBS
- **Develop new curricular materials** that are aligned with the XQ-MBS

To execute this work, the alignment review team should consult the CPEs for the badges you plan on implementing in your district as well as the learning principles as outlined in the [XQ Math Badging Framework](#). Key steps in this alignment evaluation are described in a forthcoming Introduction to Alignment document. See also this [example alignment with the Illustrative Mathematics](#) curriculum.

Evaluating the alignment of existing curricula resources with the XQ-MBS is a natural starting point. Your alignment review team should evaluate a sample of these curricular resources and determine the degree of alignment to these expectations and principles.

This kind of initial screening review can be used to determine whether existing curricular materials can support badge implementation or whether adaptations of these materials or new sets of materials will need to be developed wholesale. If your team decides that existing materials are insufficiently aligned with the goals of the XQ-MBS, looking to already-aligned curricula is a natural next step.

One option here is to adopt the freely available [XQ Project-based Mathematics Curriculum](#). Another option is to adapt the freely available and open-source [Illustrative Mathematics](#) curriculum. Both of these could either be adopted wholesale or as supplementary resources where there are gaps (aspects of a badge not covered) in your current curriculum materials.

If teachers are being directed to supplementary resources it will be important to let them know which ones specifically to include and to identify what aspects of the primary curriculum could be omitted in order to make time for the implementation of the supplementary resources. Teachers, math coordinators, and the alignment team should review these decisions after the initial implementation phase to determine whether the initial plans were realistic and to adjust as needed.

If neither of these approaches seems like a feasible option, your team would need to curate suitable high-quality instructional materials for teachers to use. If you decide to go that route, ensure ample time for development so that teachers have time to read, review, and prepare to teach using the materials.

Regardless of how curriculum materials are sourced, it is important that teachers participating in the XQ-MBS have access to curriculum-alignment documentation with sufficient time to engage with both the alignment information and any new resources before starting to teach with them. As illustrated in Table 2.1, the common instructional resources for the M101 badge were linked to the CPEs and provided centrally for teachers to use.

Action 2.6 - Review Badge-to-Assessment Alignment

It is important to understand the alignment between the badges and different kinds of existing assessments that are used to monitor progress during the year or evaluate student learning at the end of the year. This helps to document the depth of coverage of these assessments relative to the CPEs for the badges and to identify specific items in interim assessments that can be used to check for students' understanding of certain CPEs.

Table 2.2 shows an example of this mapping in Idaho for the [SmarterBalanced interim assessments](#) - interim assessment blocks and focused interim assessment blocks - with a connection to the learning targets of the ISAT, which is the state summative assessment. For state-mandated or state-provided assessments this is likely done by the state department; however, there may be district-specific assessments for which this work needs to be done locally.

Table 2.2 Mapping of Badges to Interim Assessment Items and Targeted State Standards in Idaho

Badge	Filename	Item ID	iSAT Target	Relevant Standard(s) / Cluster(s)
M100	High School MATH - Algebra and Functions II (IAB)	#14-4 1688	4A	Inferred Clusters for Claim 4: N.Q.A, A.CED.A, F.IF.B, F.BF.A, A.REI.C
M100	High School MATH - Number and Quantity Functions (FIAB)	#11-23122	4A	Inferred Clusters for Claim 4: N.Q.A, A.CED.A, F.IF.B, F.BF.A, S.ID.A, A.REI.C
M100	High School MATH - Number and Quantity (FIAB)	#6-14474	1C	N-Q.1 (N.Q.A.1)
M100	High School MATH - Performance Task - Teen Driving Restrictions (IAB)	#5-21563	4A	Inferred Clusters for Claim 4: N.Q.A, A.CED.A
M101	High School MATH - Algebra and Functions II (IAB)	#13-5 1149	1J	A-REI 11 (A.REI.D.11)
M101	High School MATH - Seeing Structure in Expressions/ Polynomial Expressions (FIAB)	#12-45390	1D	Inferred Clusters for Claim 3: A.SSE.A.2, A.APR.D.6, A.REI.D.10, A.REI.D.11
M102	High School MATH - Algebra and Functions II (IAB)	#1-83834	1I	A-REI 3

Action 2.7 - Plan Teacher Professional Development

This step is one of the most critical ones in the implementation process. In addition to the work being done to establish alignment between badges and standards, courses, curricular materials, and assessments, teachers will also need rich, ongoing professional development. The XQ-MBS is not just a change to how math learning is certified but to how teaching and learning is enacted in classrooms.

Approaches to Professional Development

There are three major pathways for providing appropriate teacher professional development to support the cultural shifts in the teacher community so that they are better equipped to lead instruction around deeper learning, portfolios, performance tasks, and badges overall:

- **Leverage existing state programs** for math badging that are available to you
- **Identify a vendor or academic partner** who can provide this support for your district (using already created training materials within the XQ-MBS)
- **Provide your own professional development** through your district staff (using already created training materials within the XQ-MBS)

Generally speaking, how you approach the professional development work may vary according to the context of the math badging work in your district:

- You may be part of a **cohort of districts within your state** who are participating, in which case some of this professional development may be coordinated at the state level across districts. If that is the case, you may want to skim through this section to develop an understanding of what professional learning teachers will experience and to plan to support them in that work. For example, who else should attend the professional learning opportunities (e.g., math curriculum directors, math coaches)?
- If the XQ-MBS work is a **district initiative without state-level support**, then it is important that you plan for this professional learning yourself. The good news is that there are “canned” modules that contain recordings, PowerPoint slides, presenter notes, and handouts that can be customized. We describe these next.

Professional Development for Onboarding Teachers

Put compactly, this professional learning should help teachers understand:

- the **core purposes** of the badging system
- the full range of **CPEs for each badge** being implemented
- the kinds of **learning activities** students should engage in
- how **modeling practices** play out across different activities
- how to **guide students** in curating their own portfolios
- how to manage the **portfolio logistics**
- how **student feedback** should be provided to support all learners
- how **badge completion** is determined
- how to **formally award badges**
- how to **connect badge completion to grades**

The above list is based on common questions that implementation partners have received from local leaders and teachers but you can fine-tune this list to suit your specific local needs.

These topics can be covered in a [three-session sequence](#) that is structured as follows:

- An overview of the **XQ-MBS**
 - [PowerPoint deck](#)
 - [Transcript of the recording](#)
 - [Recording of the presentation](#)
- An overview of what constitutes **evidence of learning**
 - [PowerPoint deck](#)
 - [Transcript of the recording](#)
 - [Recording of the presentation](#)
 - [Handouts](#)
- An overview of **modeling practices** for relevant badges
 - [PowerPoint deck](#)
 - [Transcript of the recording](#)
 - [Recording of the presentation](#)

When using either the adaptable XQ-MBS professional development materials or working with a vendor or academic partner to adapt or adopt them, it is important to maintain the integrity of the materials in line with the essential design features and goals of the system.

That said, the kinds of modifications you could make include:

- Changing the PowerPoint template to your district template
- Adding additional slides that provide district-specific information about your journey to math badging
- Engaging teachers in different kinds of ice-breakers or warm-up activities
- Alternating between presenting information live in the session and using clips from the pre-recorded presentations, particularly for sections of the presentation that focus on critical elements of the XQ-MBS
- Adding additional sense-making opportunities for teachers to talk about what they learned and how it might apply to their own work
- Including a specific exit ticket to get information from participating teachers about a specific aspect of the program or information that you want to get a pulse on

Other adaptations may be possible and we encourage you to review these resources in detail.

Professional Learning Communities for Ongoing Support

Another important mechanism for teacher professional learning is the opportunity to meet in a professional learning community (PLC) that meets regularly (e.g., at least monthly). Depending on the size of the school or district, and number of participating teachers the PLC might just be for teachers within a school, or it might include teachers from a cluster of schools.

The PLC can provide time for teachers to work through the specifics of implementing a badge, and to engage in common planning. The group could:

- **find common hooks** into the badge to help students see real-world connections to the mathematics

- **develop or identify common tasks or formative assessments** to use with strategies with how to provide effective feedback to students
- **create a badge instructional calendar** so that they are able to plan together and review student work together to develop shared understandings of expectations for a badge

District leadership should also determine whether the following financial and logistical supports can be provided:

- **Teacher stipends** for work outside of the school day
- **Coverage of substitute costs** during professional development activities
- **Extra pay over the summer** to prepare to use new materials
- **Site visits** by an instructional coach to provide job-embedded support

The more resources can be made available to teachers, either in the short term or the long run, the smoother the implementation of the XQ-MBS will be.

Once a professional development plan is created, the implementation team should plan a calendar for supporting the first two years of a school's implementation. In line with the ideas mentioned above, consider planning dates for the following:

- **Initial onboarding sessions**
- **Ongoing PLC meetings**
- **Regular site visits**
- **Administrative support**
- **Celebration events**

With regards to the last point, our partners have found that in-person, end-of-year celebration events during which stories of success from teachers and students are showcases are powerful for reinforcing a sense of community and pride in the work. This helps with positive word-of-mouth and long-term sustainability of the program, which requires a lot of leader, teacher, and stakeholder buy-in for its continued success.

Action 2.8 - Review and Adapt Grading Practices

One of the areas in which teachers need professional development is technical and adaptive challenges related to grading.

For example, depending on current practice in your district, educators may need to reconsider what is recorded as “grades” in the gradebook. This issue may require discussion and planning by the implementation team to understand current practices, both official and unofficial, and to then provide guidance for how assessment, and therefore grading, should function in a competency-based context. Drawing on prior professional learning around standards-based grading will help teachers with this transition to student-centered grading practices.

In this context it is critical to determine the degrees of flexibility that exist for different aspects that affect grading, including:

- **District and school policies** for grading
- **Gradebook configuration** in terms of the:
 - **time points** at which component or summative grades have to be submitted;

- **specifications** of what events grades are submitted for;
- **types of information** that can be submitted as a grade;
- **processes for revising and resubmit grades;** and
- **processes for connecting grades** to information about badge completion.

It is important to understand—and work to change in productive ways—the expectations of teachers, students, and family members around grades. Ideally, grading within the XQ-MBS should reflect principles of standards-based grading such as:

- **Teachers record information about student performance relative to CPEs**, rather tests or assignments;
- **Students are allowed multiple attempts** to demonstrate understanding of a particular CPE at varying paces of completion;
- **Students earn the badge or pass the course** by demonstrating mastery of a majority of CPEs; and
- **Schools have a clear plan for what happens when students complete a badge** as well as what happens when students are not yet able to demonstrate proficiency.

If a standards-based grading approach is not possible, either due to policy or system restrictions, more creative methods may be necessary such as:

- **Recording components of the portfolio** as individual assignments or tests;
- **Scoring components of the portfolio** as pass/fail; and/or
- **Giving students opportunities to resubmit** all assignments.

Most importantly, teachers, students, and families need to have clarity about how the meaning of grades is changed under the XQ-MBS, why these changes are important, and how these changes do not prevent students from having access to future opportunities (e.g., admission to colleges, considerations for employment).

Action 2.9 - Track and Award Badges

Importantly, as part of this process of grading, all participating schools in the district need to plan for tracking badge completion of all students. This can be done at the classroom / course / teacher level and be done with lower-tech approaches or with higher-tech approaches that rely on integrated digital credentialing systems.

- A **lower-tech approach** might be the use of a Google spreadsheet in which teachers record student names and IDs, the badges that they were attempting to complete, the course that this happened in, and when they completed the badge. Moreover, if they attempted the badge but did not complete the badge in a given semester or school year, comments can be included about what the next opportunity for badge completion are and what supports are provided to help the student succeed.
- A **higher-tech approach** might include a system such as [SkillStack](#) or [Canvas](#), which some of our partners have been exploring in their pilots. Systems like these ensure secure storage of badges, easy access to the badges from any device, and flexible integration into other social media sites, portfolios, or CVs. They also give badges additional face validity as they exist within a digital space that contains other badges relevant for signaling aspects of college- and career-readiness.

No matter what approach is used to track completion, students who earn badges should be recognized. This can be done within their classrooms, as part of exhibitions, town halls, or other public school events, or via newsletter and social media.

Schools might want to consider how they communicate sporting team achievements and use similar approaches to recognizing these academic achievements. Importantly, there should also be a plan for communicating with families when a student earns a badge.

Action 2.10 - Create a Digital Portfolio Management System

Our experience has shown that the management approach to the student portfolios can be a key bottleneck for the successful implementation of the XQ-MBS. As with the badge tracking approach, this can be done at various levels of digital sophistication and with a mix of physical and digital components.

Generally speaking, we recommend that a digital portfolio system is utilized to capture and annotate examples of student work, either exclusively or in parallel to a physical portfolio. A lower-tech approach would be to set this up within a common system such as [Google Classroom](#) whereas a more advanced approach would rely on more customized software platforms that optimize key management processes.

In the best systems, teachers are able to annotate student submissions to provide feedback, view when students are submitting revisions and what they have revised, and can record summative evaluations for students to see. The system should also allow teachers to take photos of student work and share each student's portfolio with the student and their family.

STEP 3 - LAUNCHING AND IMPROVING THE PROGRAM

There are five actions described in this section to help you formally launch and continually improve the implementation of the XQ-MBS:

- Action 3.1 - Ensure Sustained Leadership
- Action 3.2 - Planning for Informal Check-ins
- Action 3.3 - Observe Classroom Practices
- Action 3.4 - Obtain Legal Permissions when Necessary
- Action 3.5 - Expanding Teacher Professional Communities

Appendix B has templates that will help you document your key steps, reflections, and outcomes as you work through these actions.

These actions represent work that ought to be completed during the first year (or two) of program implementation.

After the necessary preparations for the program implementation have been taken, it is time to begin implementing the program for real. The first year or two of implementation may feel more like a partial implementation as teachers try out one or two badges in a course and may still be in the process of identifying appropriate resources. Similarly, school leaders, teachers, families, and

other external potential partners are typically still getting used to the program and may have various questions about the program goal, structure, and impact.

As we noted at the outset, many of the practices and initiatives that you started while preparing for the launch of the XQ-MBS in the previous step need to be sustained, expanded, or adapted during the program implementation. In this section, we focus specifically on areas related to leadership and ongoing check-ins as these have been critical to the success of the program in our experience.

Action 3.1 - Ensure Sustained Leadership

Leadership transitions are one of the biggest challenges for the implementation of any new program. Providing sustained leadership with consistent messaging throughout all phases of implementation is essential. Simply put, all of the Step 2 efforts listed under Actions 2.1 and 2.2 should be continued and expanded as necessary.

Leadership is also about supporting appropriate pacing of the program implementation. Generally speaking, it is preferable to stage program implementation carefully over a few years, unless a district is small and/or effective resources for managing all constituent processes are available.

If you are seeing initial success with a subset of students and teachers, you should build on these small wins and share positive words of mouth in communities of practice. We generally recommend you avoid expanding the initial implementation too fast as this gets difficult to manage and robust answers to common questions and examples of local practice are not yet available.

Action 3.2 - Plan for Informal Check-ins

Formal program evaluation is generally beyond the scope of initial program implementation work in a district, due in part to a lack of resources and in part to the fact that early implementation cycles are characterized by frequent iterations, adaptations, and imperfect practices.

Nevertheless, taking a few steps towards informal evaluation is important to demonstrate sustained interest in the success of the program at the district leadership level. The [XQ Research and Evaluation Guide](#) provides additional guidance for planning and implementing these efforts, including protocols with guiding questions during school visits.

An important part of program implementation monitoring and continuous improvement work is checking in regularly with teachers, students, and external partners about what works about the program and what needs improvement. We often refer to this as collecting student and teacher voices throughout the year.

Areas of inquiry typically include:

- Aspects of the program that are **working for educators**
- Aspects of the program that are **challenging for educators**
- Additional **support that might be needed** from the district level
- Additional ideas they have to **ensure implementation success**

These informal checks can take the form of brief surveys, exit tickets at the end of a professional learning session within PLCs, or other opportunities where teachers are invited to share their experiences with a view to making incremental improvements.

You may also want to collect information from students about their perspectives on the experience to understand what aspects seem beneficial to them and what areas they struggle with. This information can help with communication, both by teachers in class, and even at the school level.

You may also want to analyze the progress of students after a badging course, perhaps about a school year later, to investigate whether and how the badging experience has helped to prepare them for other courses or postsecondary opportunities and impacted their mathematics self-ideation.

Action 3.3 - Observe Classroom Practices

Classroom observations are a particularly powerful avenue for gaining a greater understanding of program implementation and teacher practice or bringing educators together. The most powerful professional learning often occurs when educators observe each other, experiencing classroom practices firsthand.

We recommend following best practices in the field as much as possible, which include:

- **Using standardized protocols** with important look-fors
- **Training observers** to apply the protocols as consistently as possible
- **Sampling classrooms** so that they reflect the full range of relevant experiences
- **Documenting the insights** from this work and sharing it as transparently as possible

These classroom observations should take on the flavor of formative feedback and celebrate what works. In addition, if it is possible to record select classroom sequences, these could be included in a resource bank with district examples and could be annotated / tagged accordingly.

The [XQ Research and Evaluation Guide](#) provides additional guidance for planning and implementing these observations, including a detailed rubric with look-fors that can help guide the observation process and document insightful patterns.

Action 3.4 - Obtain Legal Permissions When Necessary

We include this aspect here since it may cause unexpected data-collection issues in certain cases, depending on who is conducting the work and how the resulting information is to be used.

Generally speaking, classroom observations by school or district staff should not require special permissions from teachers, students, or their families. However, if staff from partner organizations conduct this work, this may change.

In addition, if data are used exclusively at the school or district level to provide feedback and improve practices, there should be no special permissions required. However, if video or portfolio examples of best practices are to be shared publicly in a district- or state-level database, or if anonymized student data from your district is analyzed by a partner organization, then such permissions may be necessary.

In simple terms, we recommend checking early in the process all relevant school, district, and state policies to ensure that all necessary appropriate legal permissions have been collected from participants. This even includes federal policies and laws such as [FERPA](#), [PPRA](#), and [IDEA](#).

Action 3.5 - Expand Teacher Professional Communities

Similar to other recommendations provided for this step, we recommend that you continue or expand badge-specific and general professional learning opportunities for teachers and school leaders. These PLCs provide teachers with ongoing support to deepen understanding of the

expectations for each badge, understand and prepare curricular materials, and increase their comfort in interpreting student work for evidence of learning. They also serve as essential venues for surfacing questions and collaborating in a safe space on common challenges.

Our experiences with pilot partners have shown that it is particularly important to have teachers repeatedly focus on the content of particular badges in these communities, similar to a sustained focus on particular curricular units. We have found that the following structure works quite well in this regard in which teachers where you have them:

- **plan to teach** a badge activity or sequence of activities oriented toward a goal
- **teach the activity** or sequence of activities and collect student work
- **reflect on implementation experiences** in terms of what did and did not (yet) work
- **examine student work** for evidence of learning
- **identify key examples and language** to build a shared understanding of proficiency

When collecting student work, it is particularly important to collect work examples that reflect the range of performance in the classroom and not select just the weakest or strongest examples. In addition, the examples should come from a range of activities relevant to the badge such as the pre-/post task or the performance task (when available) or core components of the portfolio. The [XQ Research and Evaluation Guide](#) provides guidance for examining student work.

As we noted before, if financially possible, it can be powerful to provide ongoing teacher support to your local schools via a professional learning provider. Teachers generally need on-demand support in addition to planned training workshops or community of practice meetings. Consider having provider representatives on site to answer questions, observe classrooms, and partner with educators one-on-one.

STEP 4 - SUSTAINING THE PROGRAM

There are three actions described in this section to help you sustain and expand the XQ-MBS over time:

- Action 4.1 - Engage Collaboratively With State Leaders
- Action 4.2 - Engage in Formal Evaluations of Impact
- Action 4.3 - Plan for Policy Changes

Appendix B has templates that will help you document your key steps, reflections, and outcomes as you work through these actions.

These actions represent work that likely can be completed after the first year (or two) of program implementation.

Similar to the previous step, one core aspect of sustaining the program is the continued, thoughtful, and effective engagement in the practices described in the previous section. In this section, we focus in particular on a few longer-term strategic actions that you can take as a district leader.

Action 4.1 - Expand Collaboration with State Leaders

Depending on how the XQ-MBS started in your district, you may have been closely collaborating with state leaders from the beginning, particularly if the work was started as a state-level initiative. Some of the alignment activities or the professional learning opportunities may have been coordinated at the state level.

State leaders can be powerful partners for sustaining an innovative initiative like the XQ-MBS. They are generally interested in lifting up what works across districts so that other districts can learn from those success stories. If you share insights from your district's successes and learnings, this can help them make the case for the continued funding of the program across districts.

Moreover, state leaders are often well connected to professional organizations and can help you share your work with like-minded leaders with whom to share successes and problem-solve challenges. They can also connect you with other district leaders within regional cooperatives (e.g., educational service center, regional educational service agency, intermediate school districts).

They may also be able to provide you with extra funds for the expansion of your work under innovation initiatives. If nothing else, working collaboratively with state leaders can help you understand what kind of additional opportunities exist outside of your district and build or expand a productive partnership.

Action 4.2 - Participate in Formal Evaluations of Impact

To demonstrate the impact of a program like the XQ-MBS, state leaders may involve an independent organization to engage in this process as they are able to leverage best practices from the field of program evaluation and implementation sciences for this work.

If your district participates in this work, it is important to contextualize the program evaluation as something that is building on formative feedback processes that the district led in early stages of program implementation.

While data collection may impose some additional burden on teachers, it is important for you to be able to understand whether and in what ways the program is working. You may be able to find ways to support teachers to find time to complete surveys during a staff meeting, engage in interviews or focus groups, and so on.

In addition to these formal evaluations, we recommend ongoing informal monitoring using the practices established under Actions 3.2 - 3.4.

Action 4.3 - Plan for Policy Changes

Innovative programs such as the XQ-MBS often uncover policies that make the authentic, meaningful implementation of the program challenging. Therefore, it is important to identify:

- which policies at the state, district, or school level are **relevant for the program**
- which of these policies are **easier to change** and which ones are **difficult to change**
- what the **process and timeline for policy change** would look like
- who needs to be involved to **make the change happen**

Beyond these tactical considerations, it is also important to consider:

- why a change to certain policies would be **desirable for the program**
- which **unintended consequences** may arise due to such a policy change

- what **workarounds** exist that legally conform with policies that cannot be changed

Policy change is generally a longer-term process that will generally span multiple school years, with the exact timeline depending on the type of policy, change, and process.

It will certainly involve your local school board and may require advocacy for policy change at the state level such as enabling the inclusion of badges in high school transcripts or counting badges as local graduation requirements. Therefore, once the need for change has been identified, it is best to plan early on for this work.

GLOSSARY

Term	Meaning
Assessment	A variety of tools and processes used to understand student learning and progress, including formative feedback during learning and summative evaluation of performance.
Badge	A key component of the XQ-MBS that represents a coherent set of Content and Practice Expectations (CPEs). A badge certifies that a student has demonstrated the targeted knowledge and skills and can be recorded as a distinct unit of learning.
Badge Catalog	The full set of badges available within the XQ-MBS, including how badges relate to one another and how they can be grouped into different pathways or integrated into existing courses.
Badge Framework	A detailed description of a specific badge that outlines its Content and Practice Expectations (CPEs), indicators (examples of student tasks), suggested instructional emphases, and guidance for collecting and evaluating evidence of mastery.
Competency-Based Education (CBE)	An approach to teaching and learning in which students progress by demonstrating mastery of clearly defined competencies, rather than by seat time. CBE can require changes to schedules, grading, and pathways to support this mastery focus.
Content and Practice Expectation (CPE)	Specifies, at a broader level, the knowledge, skills, and competencies students must demonstrate to earn a badge. Each badge contains between 3 and 11 CPEs.
Graduation Pathway	Policies or structures that allow students to meet graduation requirements through demonstrations of learning (such as badges or performance assessments) in place of, or alongside, traditional seat-time-based course credits. See also Pathway.
High-quality Instructional Materials	Curriculum resources (including units, lessons, texts, tasks, and assessments) that are coherent, content-rich, and fully aligned to rigorous academic standards; are grounded in evidence-based instructional practices; are accessible and engaging for diverse learners; and are designed to support teachers in helping all students meet or exceed grade-level expectations.
Implementation Cohort	A group of districts or schools that begin XQ-MBS implementation during the same period and participate together in shared learning activities, onboarding, and professional development.
Indicator	Specifies, at a more detailed level, the kinds of tasks or activities students should be able to complete to show mastery of a particular CPE. Each badge typically includes 5–25 indicators, or about 2–3 indicators per CPE.

Term	Meaning
Stakeholder	A person or group directly affected by, or involved in, an educational program or decision (for example, students, families, educators, school and district leaders, community partners, and policymakers).
Learning Principles	The core ideas that guide the instructional vision of the XQ-MBS, including relevance, engagement, and skill-building, and that inform how teaching and learning should look in math badging classrooms.
Mastery-Based Learning	An approach in which students progress by demonstrating that they have met clearly defined learning expectations, often through multiple opportunities to show evidence of learning and receive feedback, rather than by time spent in a course alone.
Microcredential	A focused recognition of a specific set of skills or competencies, often smaller than a traditional course credit, that can be documented on transcripts or digital records and used to signal readiness to postsecondary or workforce partners.
Pathway	An organized sequence of badges that builds over time, allowing students to deepen and extend their mathematics learning by progressing through related content and skills. See also Graduation Pathway.
Portfolio	A curated collection of student work products used to document and reflect evidence of learning. In the XQ-MBS, portfolios help demonstrate mastery for specific badges.
Portfolio System	The set of processes and tools used to collect, organize, review, and store student work products as evidence for awarding badges, including protocols for calibration, feedback, and decisions about sufficiency of evidence.
Professional Learning Community (PLC)	A structured group of educators who meet regularly to collaborate around shared goals, examine student work and data, troubleshoot implementation challenges, and co-develop practices and resources related to math badging.
Readiness / State Readiness	The degree to which a state or district has the policy conditions, leadership capacity, resources, and local interest needed to implement and sustain the XQ-MBS effectively.
Standards-Based Grading	Grading that reports how well students meet specific learning standards, rather than comparing students to one another or relying solely on overall course averages and traditional A–F grades.
XQ Math Badging System (XQ-MBS)	The overall framework of resources, tools, and structures developed by XQ to organize, support, and recognize math learning through badges at the high school level, including guidance for implementation at state and district levels.

APPENDIX A

NUMBER OF CPEs AND INDICATORS PER BADGE

Badge	Title	CPEs	Indicators
M100	Quantitative Reasoning	8	19
M101	Linear Equations: Concepts and Skills	4	10
M102	Modeling with Linear Functions and Equations	10	23
M103	Modeling with Functions of Quadratic Type	9	17
M104	Modeling with Functions of Exponential Type	9	17
M111	Modeling with Data: One-Variable Measurement Data	7	18
M112	Modeling with Data: Two-Variable Measurement Data	8	20
M113	Modeling with Probability	6	11
M151	Modeling with Geometry	8	13
M152	Reasoning and Proof Through Congruence	11	25
M153	Reasoning and Proof Through Similarity	8	18
M154	Coordinate Geometry	5	12
M155	Right Triangle Trigonometry	3	6
M201	Function Concepts	6	13
M202	Rational Exponents and Complex Numbers	3	5
M203	Polynomial and Rational Expressions, Functions, and Equations	6	13
M204	Exponential and Logarithmic Functions and Equations	4	12
M205	Trigonometric Functions	5	13
M211	Data Management and Visualization	8	17
M212	Predictive Modeling	8	22
M213	Bayesian Reasoning and Probability Theory	5	14
M214	Statistical Error and Predictive Model Validation	5	16
M215	Inference and Making Conclusions	5	17

APPENDIX B

DISCUSSION AND PLANNING TEMPLATES

The templates in this appendix should be seen as starting suggestions for how to structure internal conversations within your district. They are designed to help your team engage more deeply with the planning and implementation of the XQ Math Badging System (XQ-MBS). Below is a copy of the table of contents for this guide for ease of connecting the templates to the steps discussed in the guide.

Step 1 - Evaluating Program Fit

- Action 1.1 - Understand the Flexibility of the XQ-MBS
- Action 1.2 - Understand the Educational Goals of the XQ-MBS
- Action 1.3 - Create an Exploratory Advisory Team
- Action 1.4 - Conduct an Initial Evaluation of Fit
- Action 1.5 - Conduct a Detailed Evaluation of Fit

Step 2 - Preparing to Launch the Program

- Action 2.1 - Establish your Implementation Team
- Action 2.2 - Bring Along Other Potential Stakeholders
- Action 2.3 - Review Badge-to-Standards Alignment
- Action 2.4 - Review Badge-to-Course Alignment
- Action 2.5 - Review Badge-to-Curriculum Alignment
- Action 2.6 - Review Badge-to-Assessment Alignment
- Action 2.7 - Plan Teacher Professional Development
- Action 2.8 - Review and Adapt Grading Practices
- Action 2.9 - Track and Award Badges
- Action 2.10 - Create a Digital Portfolio Management System

Step 3 - Launching and Improving the Program

- Action 3.1 - Ensure Sustained Leadership
- Action 3.2 - Plan for Informal Check-ins
- Action 3.3 - Observe Classroom Practices
- Action 3.4 - Obtain Legal Permissions When Necessary
- Action 3.5 - Expand Teacher Professional Communities

Step 4 - Sustaining the Program

- Action 4.1 - Expand Collaboration with State Leaders
- Action 4.2 - Participate in Formal Evaluations of Impact
- Action 4.3 - Plan for Policy Changes

TEMPLATES FOR STEP 1 - EVALUATING PROGRAM FIT

TEMPLATE S1.1

Use this template to capture your district's current math context and initial thinking about whether XQ-MBS is worth deeper exploration.

Discussion Template for Action 1.1 - Understand the Flexibility of the XQ-MBS

Meeting: *List date and location*

Participants: *List persons and roles*

Next Steps: *Based on this review, is there sufficient interest to form an advisory team to review XQ-MBS materials more closely?*

Initial Reflections	Comments
<p>Current state of high school mathematics in our district</p> <p>What information do you have about participation in high school math courses?</p> <ul style="list-style-type: none">• Are any of the courses a barrier to continued study?• How do your students perform on state accountability assessments in relation to other districts in your state?• What proportion of students go on to further studies in higher education or to careers that require mathematics?• What are the major employers in your area and the math needs in those contexts? <p>How do these data, taken together, support the need for a change?</p>	

Initial Reflections	Comments
<p>Initial reflections regarding the value and relevance of the XQ-MBS for your school district</p> <p>In what ways might the XQ-MBS:</p> <ul style="list-style-type: none"> • support or accelerate changes to mathematics teaching and learning practices? • support students who are struggling to succeed in mathematics? • increase student engagement in mathematics? • support or accelerate teacher professional learning? • increase student perception of the value of mathematics for a broad array of future studies and careers? <p>Other observations and reflections you want to capture?</p>	
<p>If the XQ-MBS work continues in your district, you will bring other stakeholders on board.</p> <p>Develop three bullet statements that represent your current thinking for why the XQ-MBS is worth continuing to explore.</p>	<p>We want to make this change because...</p> <ul style="list-style-type: none"> • • •

TEMPLATE S1.2

Discussion Template for Action 1.4 - Conduct an Initial Evaluation of Fit

Meeting: *List date and location*

Participants: *List persons and roles*

Next Steps: *Based on this review, is there sufficient interest for the advisory team to evaluate XQ-MBS materials in more detail?*

Initial Reflections	Comments
<p>Learning Principles</p> <ul style="list-style-type: none"> • What aspects of the vision of math pedagogy encapsulated by these learning principles are particularly compelling to you? • What other local efforts to transform mathematics instruction or high school instruction more generally do they align with? • Do any aspects appear to be in conflict with the broader instructional vision that you have for your district? 	
<p>Badge Catalog</p> <ul style="list-style-type: none"> • Which badges do you think would be of interest for your students given your current course offerings? • Which badge pathways do you think would be of interest for your students given your current course offerings? • Are there certain student groups that might benefit particularly strongly from badges or badge pathways? 	
<p>Badge Frameworks</p> <ul style="list-style-type: none"> • Which courses with their associated standards align well with the content and practice expectations (CPEs) and the indicators for these badges? • Which opportunities exist for allowing the completion of the badges across different courses instead of a single course? 	

TEMPLATE S1.3

Discussion Template for Action 1.5 - Conduct a Detailed Evaluation of Fit

Meeting: *List date and location*

Participants: *List persons and roles*

Next Steps: *List next steps on the basis of these discussions, including timelines and who is responsible*

Based on your review of Action 1.5, which aspects of your district would support or hinder the implementation of the XQ-MBS?

Aspect	Current Status	Possible Next Steps
Policy conditions at federal, state, or local level		
Opportunities for mutual learning and resource sharing among educators		
Development of educators' asset orientations for themselves and their students		
A potential professional development / coaching provider		
Flexibility in grading policies		
Curriculum support for the core vision of instruction of the program		
Resources available to support program implementation		

TEMPLATE S1.4

District Readiness Survey to Support Action 1.5 - Conduct a Detailed Evaluation of Fit

XQ District Readiness Self-Assessment

All of the questions in this self-assessment are designed to be used with a five-point scale with the following levels / scale points:
1 - Disagree, 2 - Somewhat Disagree, 3 - Neutral, 4 - Somewhat Agree, 5 - Agree.

We recommend administering this survey via a survey tool such as Google Forms or Survey Monkey.

Vision Setting

Unites the community around a shared purpose and provides clarity to inform decision-making and planning

1. Our district has demonstrated capacity to set measurable and achievable goals, along with strategies to achieve them.
2. Our district has articulated a broad vision of student success utilizing college and career-ready markers.
3. Our district views high school redesign as essential for all schools, not just as a “turnaround strategy” for low-performing schools.

Experimentation and Innovation

Enables districts to adapt to changing needs, pilot new approaches, and ensure that all students are equipped for success.

1. Our district consistently prototypes and pilots new ideas.
2. Our district captures and uses data to imagine and inform new and different ways of doing things.
3. Our district successfully implements changes to learning environments and experiences.
4. Our district seeks feedback to engage and build deep knowledge among educators when new initiatives roll out.

Leadership Ability and Alignment

Enables district leaders to guide transformation, build strong teams, and communicate with the community

1. High expectations for all are core to our district leadership team’s vision.
2. Our district leaders embrace their roles and responsibilities as change agents and vision keepers.
3. Our district leadership team creatively utilizes financial and organizational resources to bring new ideas to life.
4. Our district leadership team communicates authentically, transparently, and consistently to both internal and external stakeholders, including schools, families, community, and governmental entities.
5. Our district leadership team effectively engages and collaborates with the local community on challenges, new ideas, and solutions.
6. Our district leadership team has a well-defined succession plan in place and possesses a strong bench strength in the central office.

Financial and Community Resources

Support initiatives that improve student learning and provide students with real-world experiences and career pathways

1. Our district demonstrates equitable, student-based funding practices.
2. Our district has strong relationships with community partners that support student success and open pathways to college and career.
3. Our district can partner with a public education fund or similar organization dedicated to raising and overseeing philanthropic dollars on behalf of the district.
4. Our district can commit to a multi-year process.

Political Environment

Can significantly impact the design journey, from education policies to funding priorities

1. Our constituents (i.e., parents, the school board, civil rights groups, local/state government leaders) are calling for change.
2. Our school board or local/state governing body views high school transformation as a necessary and critical process.
3. We can point to specific conditions in our district that drive the need for transformation.
4. We can point to specific conditions within our district that provide a foundation for transformation.

Broad District Leadership Capacity

Enables leaders to drive change, make effective decisions, and inspire others along the way

1. Our district leaders have the reputational credibility to lead a transformation.
2. Our leadership has a track record of leading innovation.
3. Our district leadership roles are stable and fully staffed.

Staff Capacity

Portrays the team's ability to cross-functional analysis to adapt to new approaches, acquire new skills, and embrace change

1. Our district demonstrates stable operating conditions (e.g., teacher staffing, funding).
2. Our leadership team can stand up a committed team and make the organizational changes necessary to support high school redesign.
3. Our district has school-level leaders with the experience, talent, and ambition to undertake high school redesign.

Policies and Regulations

The ability to shift policy and regulation to unlock innovation, test new curriculum models, and rethink the learning experience.

1. Our teacher and school leader contracts provide the flexibility needed for innovation.
2. Our local and state policies and regulations provide flexibility around curriculum use.
3. Our district is open to rethinking where and how learning takes place.
4. Our district's relationship with our state education leaders is responsive and productive.

Quality of Existing High Schools

Ensures that all students have access to an excellent education, regardless of their background or circumstances.

1. Students of all backgrounds are able to successfully graduate from high schools in our district.

Data: What is the graduation rate for each high school, disaggregated by race/ethnicity and socioeconomic status?

2. Students of all backgrounds are well-prepared to enroll in college.

Data: What is the college-going rate for each high school, disaggregated by race/ethnicity and socioeconomic status?

3. All schools, regardless of location within the district, are high-performing.

Data: What is the geographic distribution of higher- and lower-performing schools?

TEMPLATES FOR STEP 2 - PREPARING TO LAUNCH THE PROGRAM

TEMPLATE 2.1

This template allows you to plan for and capture key opportunities for stakeholder engagement around the XQ-MBS. The first three rows are made-up (but realistic) examples. Adapt as needed for your local context.

Tacking Template for Action 2.2 - Bring Along Other Potential Stakeholders

Opportunity	Date(s)	Partners	Structure	Activities / Materials
Regional in-person townhalls	April 15-30	School and district leaders, families, community members	Information sharing and basic Q&A: Overview of program, relevance for student learning and grading	Brief overview talk (10 mins), overview flyer, set of possible FAQs with answers (internal); open discussion
Student and family "Math Futures" night	Late May (evening event, 90 minutes)	High school math teachers, counselors, families, students, local college/career representatives	Interactive showcase and dialogue focused on why math badging matters for postsecondary options	Short student-friendly overview of XQ-MBS (slides or short video), stations with sample badge artifacts/portfolios, panel with a teacher, counselor, and local employer or college rep, feedback forms for families and students
Teacher leader focus group on grading and reporting	Early March (after-school 60-75 minutes)	Department chairs, instructional coaches, selected high school math teachers	Small-group working session to connect XQ-MBS with existing grading and reporting practices	One-page summary of XQ-MBS grading implications, sample badge-aligned report card language, discussion protocol to surface concerns and opportunities, exit ticket to capture specific supports teachers would need

TEMPLATE 2.2

This template allows you to map out professional learning opportunities for the teachers in your district. The first three rows are made-up (but realistic) examples. Adapt as needed for your local context.

Template for Action 2.7 - Plan for Teacher Professional Development

Primary Learning Goal	Venue / Mechanism	Duration / Dates	Activities / Materials	Funding Needed	Possible Source
Teachers familiarize themselves with portfolios (management + support)	In a math badging boot camp	1 day during the summer window	Use portfolio camp materials provided by XQ, demo local portfolio management systems	Extra pay over the summer to prepare to use new materials (approx. \$175/teacher)	District PD budget
Teachers review student work on an ongoing basis to develop understanding of rigor	As part of the monthly math community of practice	1 special breakout group during Oct and Nov meetings, 30 minutes	Use student work samples from XQ and ask teachers to bring in local ones, have them review/revise rubrics, do independent ratings and discussion	Coffee/snacks - teacher time is part of locally negotiated contract	Math chair discretionary budget
Teachers integrate badge-aligned formative feedback into regular classroom assessments	Collaborative department planning time (e.g., common planning period)	Three 45-minute sessions in September and October	Review sample badge-aligned tasks and rubrics; co-design one common quiz or task per course that aligns to a selected badge; script feedback language and plan how students will revise work based on feedback	Stipends for teachers who participate outside contract time (if needed)	Title II funds or district instructional improvement budget

TEMPLATE 2.3

This template allows you to review the fit of your current grading practices and guidelines with the XQ-MBS to identify possible tension points and solutions early on. Adapt as needed for your local context.

Template for Reviewing Grading Practices and Guardrails for Action 2.8 - Review and Adapt Grading Practices.

Meeting: *List date and location*

Participants: *List persons and roles*

Next Steps: *List next steps on the basis of these discussions, including timelines and who is responsible*

Aspect of Grading	Possible Tension Points	Possible Risks	Possible Solutions	Threat
Grading policies <i>(insert links to online documents or note where these can be found)</i>	Grading policies require every piece of student work to be graded	May lead to meaningless grading of badge components, may change instruction so as to comply with grading	Create a waiver for complying with grading policies in math badging courses	High
Gradebook system	Gradebook only accepts percentage or point-based entries and requires category weights (e.g., tests/quizzes/homework), which do not map cleanly onto “badge earned/not yet earned.”	Teachers may enter “proxy” grades for badge progress (e.g., many small scores), confusing students and families and obscuring what “earning a badge” actually means.	Work with the SIS/gradebook vendor or IT team to create special “badge” categories or pass/not-yet structures; provide a recommended district-wide gradebook setup for math badging courses.	High
Grading history	Past grading practices emphasize averaging scores over time and using a small number of high-stakes tests, rather than allowing revision and focusing on most recent or best evidence of learning.	Teachers may resist allowing reassessment or portfolio-based evidence because it feels inconsistent with prior expectations; students may not understand why grading looks different in some math courses.	Provide clear district guidance that math badging courses will prioritize most recent evidence and allow structured reassessment; share examples, FAQs, and messaging for families to explain the shift from averaging to mastery-focused grading.	Medium

TEMPLATE 2.4

This is a sample spreadsheet for tracking badge completion of students. Only students who intend to complete a badge should be listed. It is best maintained as a Google Sheet or Excel spreadsheet rather than a Word table. Adapt as needed for your local context.

Template for Tracking Student Badge Completion for Action 2.8 - Track Badge Completion.

Student Name	Teacher Name	School	Course (if applicable)	Badge	Completed	Date of Completion	What Remains Incomplete
Name 1	Name 1	School Name 1	Algebra I	M101	Yes	Date 1	N/A
Name 2	Name 1	School Name 1	Algebra I	M101	No	N/A	Performance Task
Name 3	Name 2	School Name 1	Geometry	M151	Yes	Date 2	N/A

TEMPLATES FOR STEP 3 - LAUNCHING AND IMPROVING THE PROGRAM

TEMPLATE 3.1

This template is for planning simple, informal check-ins with teachers. We recommend brief surveys, informal conversations, or cross-school focus groups for this. The first three rows are examples. Adapt as needed for your local context.

Template for Planning Check-ins for Action 3.2 - Planning for Informal Check-ins.

Meeting: *List date and location*

Participants: *List persons and roles*

Next Steps: *List next steps on the basis of these discussions, including timelines and who is responsible*

Opportunity		Dates	Required Materials
Professional learning community focus group		November XX, March XX	Focus group questions / protocol
School leader 1:1s		Monthly	Email with questions for school leaders
5-question Survey		At the end of fall and spring semesters	Survey draft

Questions

The following questions should be asked consistently in each of these settings:

- What aspects of the program are working for you?
- What aspects of the program are challenging for you?
- What additional support do you need from your school or the district?
- What additional ideas do you have to ensure implementation success?

TEMPLATE 3.2

This is a list of tools for observing classroom practices. They are grounded in research and inspired by the work of the initial piloting partners. Adapt for your local context as needed.

Classroom Observation Protocols for Action 3.3 - Observe Classroom Practices

Developer	Name	Connection	Adaptations	Validity	Cost
Student Achievement Partners	Instructional Practices Guide - High School Mathematics	Developed by same organization as XQ-MBS, originally for Common Core math instruction	Could be adapted to reflect learning principles for XQ-MBS	TBD	Free
University of Alabama	Mathematics Classroom Observation Protocol for Practices (MCOP²)	Developed by university faculty	Not necessarily needed	Scale structure and reliability evaluated with data from XXX	Free

TEMPLATES FOR STEP 4 - SUSTAINING THE PROGRAM

TEMPLATE 4.1

This template is designed to help you think through the key programmatic goals for the implementation of the program. Doing this is the foundation for program evaluation in which your district may eventually participate. Adapt to your local context as needed.

Guiding Questions for Action 4.2 - Identify Key Factors Affecting Program Implementation

Program Goals

- What are the most important educational goals that the program implementation is designed to solve?
- What are the most important short- and long-term goals for students? How can their attainment be measured / captured?
- What are the most important short- and long-term goals for teachers? How can their attainment be measured / captured?
- What are other important short- and long-term goals for schools or the district? How can their attainment be measured / captured?

Program Mechanisms

- How can the program design help to accomplish the above goals for teachers, students, or others?
- What critical actions can/must the district take during program implementation to support these goals?
- What critical actions can/must schools take during program implementation to support these goals?
- What other resources are needed to help the program meet these goals during implementation?

Contextual Factors

- What other notable events/factors/conditions might affect the positive outcomes of the program? In what ways might this happen?
- What can/must be done to reduce/minimize/eliminate the impact of these events/factors/conditions?
- What negative, unintended consequences might the program implementation have on students, teachers, or schools/ the district?
- What can/must be done to reduce/minimize/eliminate these negative, unintended consequences?

You might tackle these questions over a series of meetings with both your implementation team and state-level partners. You should document each conversation and interaction to help you come to some final conclusions about what you want to focus on in an evaluation.

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