Kentucky Department of EDUCATION

Cultivating Vibrant Learning Experiences in Mathematics: Series One
Facilitator's Guide

Module Overview:

Developed by the Kentucky Department of Education (KDE), the *Cultivating Vibrant Learning Experiences in Mathematics* professional learning series seeks to deepen content knowledge and pedagogy, clarifying what to teach and how best to teach it through the use of high-quality instructional resources being used in Kentucky classrooms. The KDE's Curriculum Based-Professional Learning Guidance Document states:

> "Research demonstrates that simply providing teachers with a curriculum and HQIRs without also providing them professional learning focused on how to implement those resources effectively to meet the needs of all students will not impact student achievement. **Educators need professional learning that deepens understanding of what to teach, improves content knowledge and pedagogy through exploring how best to teach it, and facilitates transfer by being connected to the curriculum used in classrooms."**

This Facilitator's Guide is built to support a deep exploration of the components of the series which provides K-12 educators with the opportunity to learn and grow together as learners and practitioners through a series of four, two-hour sessions. Participants experience an adult learning environment designed to mirror the student classroom experience, utilizing high-quality instructional resources and videos featuring Kentucky classrooms. Special emphasis is placed on exploring teaching and learning within specific grade bands (primary, intermediate, middle and high).

While the duration and scope may be customized to accommodate local needs and conditions, it is recommended that the sequence of the sessions be maintained since the sessions build upon one another.

Goals:

The *Cultivating Vibrant Learning Experiences in Mathematics* professional learning series seeks to deepen content knowledge and pedagogy, clarifying what to teach and how best to teach it through the use of high-quality instructional resources.

The workshop will specifically elevate connections among:

- *Kentucky Academic Standards (KAS) for Mathematics*;
- Evidence-based Instructional Practices, specifically the Effective Mathematics Teaching Practices outlined by the National Council of Teachers of Mathematics (NCTM); and
- High-Quality Instructional Resources (HQIRs) in mathematics.

Intended Audiences:

Participants may include, but are not limited to, classroom teachers, team leads/department chairs, special educators, intervention specialists, staff who actively support mathematics teaching and learning and pre-service classroom teachers. In addition, schools/districts may choose to have anyone planning to conduct observations and/or walkthroughs within mathematics classrooms participate in this learning in order to deepen knowledge of mathematical content and pedagogy, as both should be evident within classroom instruction. This might include district leadership, school administrators and/or instructional specialists/coaches.

Facilitators may include, but are not limited to, regional cooperative staff, district leadership, school administrators, instructional specialists/coaches, intervention specialists, department chairs, special educators, classroom teachers and higher education faculty.

In acknowledgment of the dedication and expertise demonstrated by the educators in attendance at the session, it is fitting to provide certificates as proof of learning hours at the conclusion of this learning experience. These certificates serve as tangible evidence of a commitment to continuous professional development and lifelong learning. Participants who complete the provided professional learning survey linked within the facilitator notes will receive a certificate of completion from the KDE. Please remember: Educators can use the Professional Learning Bulletin Board (PLBB) to find learning sessions, but it is the local school district who determines if they are acceptable for credit based on their district policies. See 704 KAR 3:035 for more details.

Module Sessions:

Completing this module in its entirety will take approximately eight hours. Facilitators may choose to print copies of the materials listed below, have participants print their own copies or have participants access the materials digitally. If participants are responsible for printing their own copies, please specify that and provide necessary links within the invitation to the session.

Using This Facilitator's Guide:

This Facilitator's Guide provides suggestions for structuring the four-part series, including recommended activities to prompt meaningful investigation of High-Quality Instructional Resources, the *KAS for Mathematics,* and NCTM's Effective Mathematics Teaching Practices with guidance on talking points to use alongside the provided PowerPoint presentation. The recommended learning activities and optional extended learning opportunities are provided to aid in developing participant knowledge and familiarity with how High-Quality Instructional Resources offer students access and opportunity to engage with the *KAS for Mathematics.* In particular, this four-part series highlights the importance of Effective Mathematics Teaching Practice #1: Establishing mathematics goals to focus on learning.

Module Connections to Curriculum Based Professional Learning

Curriculum-based professional learning in mathematics must be grounded in the *KAS for Mathematics*, evidence-based instructional practices and the district-selected high-quality instructional resource (HQIR).

When structuring these types of high-quality professional learning experiences, they should include:

(1) the sharing and processing of learning to build a common understanding,

(2) a chance for educators to internalize and practice the knowledge, understandings and skills they are developing,

(3) analyze and student thinking and work and then

(4) space for reflection where results are analyzed to inform next steps.

The organization of this module aligns tightly to that structure.

For more support with how this module might fit within the local vision of quarterly professional learning cycles, access the KDE's Structuring Professional Learning Cycles.

A Note for Facilitators:

The sample lessons from High-Quality Instructional Resources within each session were selected to highlight key features connected to the intended learning outcomes of the particular session in which they are referenced. Facilitators are encouraged to be empowered in making connections to the High-Quality Instructional Resource being used in the context in which these sessions are being conducted.

Session 1: How can we establish goals to focus learning in mathematics?			
Purpose	**Before**	**During**	**After**

Shared Learning:

Participants will engage in the sharing and processing of learning to build a common understanding, including learning related to:

- the *KAS for Mathematics,*
- *High Quality Instructional Resources*
- NCTM's Effective Mathematics Teaching Practices.

Essential Question:

How can we establish goals to focus learning in mathematics? Let's share ideas.

Session Goal:

Develop a shared understanding around what learning mathematics looks like, feels like and sounds like when teachers and students have **established mathematics goals to focus learning**.

Including:

- Connecting goals to the *KAS for Mathematics*
- Exploring EMTP 1 Teacher and Student Look Fors
- Examining sample learning experiences for each grade band

Facilitator Materials:

- Facilitator's Guide
- Session 1 PowerPoint
- Session 1 Recording

Participant Materials:

All Participants:

- Session 1 Participant Guide
- Engaging the SMP Questions & Look Fors

Sample Tasks per Grade Band:

- Primary: Hungry Caterpillar
- Intermediate: Band Concert
- Middle: Candy Jar
- High: Pay It Forward

It will be important to have access to the *KAS for Mathematics* during the session as well.

General Optional Materials:

- Chart paper
- Sticky Notes
- Markers

Estimated time: 2 hours

Slides	Outline
1-10	Introduction: • Series Goal • Welcome • Series Overview • Session Goals
11-24	Do the Math • 13-15: Primary • 16-18: Intermediate • 19-21: Middle • 22-24: High
25-36	Shared Learning: KAS for Mathematics • Opportunity Myth • Target of the Standard • Coherence/Vertical Alignment • Standards for Mathematical Practice
37-62	Shared Learning: Effective Mathematics Teaching Practices • 42-48: Primary • 49-54: Intermediate • 55-60: Middle • 61-67: High
68-74	Reflection & Wrap Up

Plan ahead for Session 2.

Extended Learning Opportunity: (Optional)

During the session we discussed the importance of having mathematics goals that reflect the grade-level expectations within the *KAS for Mathematics*.

- Select a standard you (or your team) will be teaching soon.
- Complete the Breaking Down a Standard protocol for that standard.

There are samples available for each grade-level (K-8) and each high school conceptual category.

Consider:

How might instruction aligned to this standard be supported by Effective Mathematics Teaching Practice #1? What might that look like, feel like and sound like?

Session 2: Why is lesson internalization important?

Purpose

Lesson Internalization:

Participants will engage in the process of lesson internalization with a focus on:

- the *KAS for Mathematics,*
- *High Quality Instructional Resources*
- NCTM's Effective Mathematics Teaching Practice 1

Essential Question:

Why is lesson internalization important? Let's move beyond planning.

Session Goals:

- Examine how HQIRs embed and enhance access to grade-level content and effective mathematics instruction
- Distinguish between the process of "lesson planning" and "lesson internalization"

  Including internalizing a lesson from a grade-band specific HQIR being used in Kentucky classrooms

Before

Facilitator Materials:

- Facilitator's Guide
- Session 2 PowerPoint
- Session 2 Recording
- EMTP 1 Video Clip: Teacher Interviews

Participant Materials:

All participants:

- Session 2 Participant Guide

Sample Lesson (Teacher Edition):

- Primary: Grade 2: iReady
- Intermediate: Grade 5: enVision
- Middle: Grade 7: Amplify Desmos
- High: Geometry: Illustrative Mathematics

It will be important to have access to the *KAS for Mathematics* during the session as well.

General Optional Materials:

- Chart paper
- Sticky Notes
- Markers

During

Estimated time: 2 hours

Slides	Outline
1-6	Introduction: • Welcome • Series Overview • Session Goals
7-14	Setting the Stage • Vibrant Learning • Revisiting EMTP 1: Video Reflection
15-31	Do the Math 17-20 Primary 21-25 Intermediate 26-29 Middle School 30-34 High School
35-39	Why HQIRs?
40-49	Lesson Internalization Conversation
50-53	Reflection & Wrap Up

After

Plan ahead for Session 3.

Extended Learning Opportunity: (Optional)

Choose one of the Practice Guides from What Works Clearinghouse:

- Elementary Focused: *Teaching Math to Young Children*
- Secondary Focused: *Teaching Strategies for Improving Algebra Knowledge in Middle School and High School Students*

Review the recommendations and determine how they might relate to the ***Effective Math Teaching Practice 1 Teacher and Student indicators***.

Consider:
How are these recommendations reflected in the design of our HQIR to support grounding instruction in evidence-based practices?

Session 3: How do we analyze and respond to student thinking?

Purpose

Analyze and Respond to Student Thinking:

Participants will engage in the process of analyzing and responding to student thinking supported by their understanding of:

- the *KAS for Mathematics,*
- *High Quality Instructional Resources*
- NCTM's Effective Mathematics Teaching Practice 1

Essential Question:

How do we analyze and respond to student thinking? Let's move learning forward.

Session Goals:

- Analyze classroom video to identify ways in which a task from a high-quality instructional resource elicits evidence of the teacher and student indicators for Effective Mathematics Teaching Practice 1.
- Explore how HQIRs support making connections across student work, looking for learning trends and determining next instructional steps.

Before

Facilitator Materials:

- Facilitator's Guide
- Session 3 PowerPoint
- Session 3 Recording
- EMTP 1 Video Clip: Grade 7 Classroom

Participant Materials:

- Session 3 Participant Guide
- Engaging the SMP Questions & Look Fors

Sample Lesson (Student Edition):

- Primary: Grade 1 Illustrative Mathematics
- Intermediate: Grade 4 Illustrative Mathematics
- Middle: Grade 8 enVision
- High: Algebra 1 Amplify Desmos

It will be important to have access to the *KAS for Mathematics* during the session as well.

General Optional Materials:

- Chart paper
- Sticky Notes
- Markers

During

Estimated time: 2 hours

Slides	Outline
1-8	Introduction: • Welcome • Series Overview • Session Goals
9-12	Setting the Stage • Revisiting EMTP 1: Video Reflection
13-20	Analyzing and Responding to Student Thinking
21-43	Do the Math 23-27 Primary 28-33 Intermediate 34-38 Middle 39-43 High
44-71	Analyzing Student Thinking 50-55 Primary 56-60 Intermediate 61-64 Middle 65-70 High 71 Debrief
72-80	Responding to Student Thinking 75-77 Primary 78-80 Intermediate 81-83 Middle 84-86 High
87-90	Reflection & Wrap Up

After

Plan ahead for Session 4.

Extended Learning Opportunity: Optional

Practice Analyzing and Responding to Student Thinking::

1. Select a grade-level task from an HQIR you plan to use with your students.
2. Generate possible approaches and struggles students might have.
3. List the content and practice standards from the *KAS for Mathematics*.
4. Share 3 to 5 examples of student work from the task with your PLC. List the strengths you see in each piece of student work.
5. Discuss how you might select and sequence the work when using them with students in the classroom.
6. Finally review guidance from your HQIR and/or the Engaging the SMP Questions & Look Fors to determine what feedback you might give students about their strategies.

Session 4: What have we learned together?

Purpose

Quarterly Reflection:

Participants will engage in reflection to inform next steps and consider ways to shift practice forward with the lens of:

- the *KAS for Mathematics,*
- *High Quality Instructional Resources*
- NCTM's Effective Mathematics Teaching Practice 1

Essential Question:

What have we learned together?

Let's reflect.

Session Goal:

Engage in more formal collaborative reflection to:

- recognize shifts in practice;
- celebrate progress;
- synthesize important takeaways; and
- determine potential support still needed.

Before

Facilitator Materials:

- Facilitator's Guide
- Session 4 PowerPoint
- Session 4 Recording
- EMTP 1 Video Clip: HQIR Reflection
- EMTP 1 Video Clip: Grade 4 classroom

Participant Materials:

All participants:

- Session 4 Participant Guide
- KDE HQIR One-Pager

Sample Lesson (Teacher Edition):

- Primary: Kindergarten Amplify Desmos
- Intermediate: Grade 4 iReady
- Middle: Grade 6 Illustrative Mathematics
- High: Geometry enVision

It will be important to have access to the *KAS for Mathematics* during the session as well.

General Optional Materials:

- Chart paper
- Sticky Notes
- Markers

During

Estimated time: 2 hour

Slides	Outline
1-8	Introduction: • Welcome • Series Overview • Session Goals
9-14	Why HQIRs?
15-37	Do the Math • 17-22 Primary • 23-27 Intermediate • 28-32 Middle • 33-37 High
38-53	Shifts in Classroom Practice • Sample 1: Classroom Video • Sample 2: HQIR Lesson • Self-Reflection
54-55	Wrap Up

After

Extended Learning Opportunities: Optional

Review an upcoming lesson from your HQIR.

Refer to the Teacher Actions and Student Actions for EMTP 1, as well as the shifts document shared within the Session 4 Participant Guide.

(Note: Each Quarterly Reflection session will include the full shift for each EMTP of focus to support educator self-reflection; however, for a simplified look across all 8 accessing the Teacher Practices and Shifts in Classroom Practice Look Fors.)

Consider:

How does this lesson support you in establishing goals to focus learning in mathematics?

Building a Community:

Building a community is important for any group that will work together, especially if participants have not worked together before. The concept is the same as building a safe, respectful, productive classroom climate. Incorporating community-building into each session builds trust, shows participants they are valuable as individuals and engages them in the learning process. It is also useful for creating a professional learning network where participants can be supported in their work. Community-building can be as simple as allowing participants to introduce themselves and their role in the school/district, developing or refining group values, allowing for questions and/or the sharing of reflections throughout the module. Time allotted for community-building will allow participants to have a voice and be engaged as active contributors and learners.

Throughout the module, participants will be expected to collaborate in a variety of ways. Attending to the group values will be critical for participants to actively participate and accept collective responsibility for the successful attainment of the module goals.

Helpful Hint:

It is important to realize that while you are the facilitator of these work sessions, you may not have all the answers to the questions asked by participants. When this happens, reflect on this quote from Graham Fletcher, “Every teachable moment doesn’t need to be a teachable moment, in that moment.” If participants ask questions, you are not prepared to answer, offer to seek out answers to those questions and share with the larger group. If the question is pressing and doesn’t appear to be addressed in this module, you may email questions and/or feedback to kdemath@education.ky.gov.