Kentucky Department of EDUCATION

Evidence-Based Instructional Practices

Clarifying and Sharing Clear Learning Goals and the Kentucky Academic Standards (KAS) for Mathematics

The Clarifying and Sharing Clear Learning Goals Overview provides the research base associated with this evidence-based instructional practice.

What are connections between Evidenced-Based Instructional Practice #2: Clarifying and Sharing Clear Learning Goals and the *KAS for Mathematics*?

The driving question behind the development of the *KAS for Mathematics* was simple, "What is best for Kentucky students?" The standards set forth a statewide baseline of what students should know and be able to do after instruction, but do not address how learning experiences are to be designed or what resources should be used. As those decisions are left to educators within local schools and districts, clarifying and sharing clear learning goals (EBIP #2) becomes central to the success of every student within every classroom within every school across the commonwealth.

Teacher clarity requires that teachers have a deep understanding of what students must know and be able to do to reach the grade-level expectations outlined within the *KAS for Mathematics* and then use that clarity to plan meaningful lessons designed to help students reach those expectations. The architecture of the *KAS for Mathematics* was intentionally designed to embed instructional supports for teachers. Instructional supports which had previously lived outside the standards document are now embedded within, such as guidance on implementing the Standards for Mathematical Practice and the Clarifications section, which includes information on Coherence/Vertical Alignment.

In order for teachers to support students in understanding the purpose of the learning and what success looks like, teachers must have clarity around what the standards are asking students to know and be able to do. For example, within the *KAS for Mathematics*, the standards emphasize procedural skill and fluency, building **from** conceptual understanding **to** application and modeling with mathematics, in order to solve real world problems. Having the ability to discern whether a standard is targeting conceptual understanding, procedural skill/fluency and application is not only critical within the planning and delivery of instruction, it is also imperative when considering how to offer students equitable learning opportunities in mathematics classrooms across the state.

According to TNTP's Opportunity Myth, "greater access to the grade-appropriate assignments, strong instruction, deep engagement and teachers who hold high expectations can and does improve student achievement - particularly for students who start the school year behind". In considering the interconnected nature of the four commitments mentioned, it becomes evident that, while teacher clarity has always had a significant impact on student success, it is

perhaps even more valuable now in considering how to address the current challenges schools face. For teachers, whose daily choices influence students' outcomes in the most visible ways, it becomes evident that clarity around the *KAS for Mathematics* is central to achieving "what is best for Kentucky students."

What are planning considerations for the successful implementation of the Evidenced-Based Instructional Practice #2: Clarifying and Sharing Clear Learning Goals to ensure that all students have equitable access and opportunity to learn the standards contained in the *KAS for Mathematics*?

- Develop a thorough understanding of grade-level standards. Within mathematics, the Breaking Down a Standard resource highlights the role each component within the *KAS for Mathematics* plays in answering the question, **"What do we expect our students to learn?"** by guiding educators through thinking about the following:
    - What is the **domain/conceptual category/big idea**? What is the broader **cluster** level understanding the standard plays a role in building?
    - The Standards for Mathematical Content are a balanced combination of conceptual understanding, procedural skill/fluency and application. What is the target of the standard?
        - **Conceptual understanding** refers to understanding mathematical concepts, operations and relations. Conceptual understanding is more than knowing isolated facts and methods; students should be able to make sense of why a mathematical idea is important and the kinds of contexts in which it is useful. Conceptual understanding allows students to connect prior knowledge to new ideas and concepts.
        - **Procedural skill and fluency** is the ability to apply procedures accurately, efficiently, flexibly and appropriately. It requires speed and accuracy in calculation while giving students opportunities to practice basic skills. Students' ability to solve more complex application and modeling tasks is dependent on procedural skill and fluency.
        - **Application** provides a valuable context for learning and the opportunity to solve problems in a relevant and a meaningful way. It is through real-world application that students learn to select an efficient method to find a solution, determine whether the solution(s) makes sense by reasoning and develop critical thinking skills.
    - What **specific representations or strategies** need to be considered when planning instruction around the standard? Are there **possible misconceptions** that will need to be addressed during instruction?
    - To emphasize the cohesiveness of the K-12 standards, the **Coherence/Vertical Alignment** indicates a mathematics connection within and across grade levels.
        - How does this standard build off of prior learning?
        - How does this standard support future learning?
        - How does this standard connect to other standards, other clusters or domains?

    - The standards emphasize the importance of the **standards for mathematical practice**; whereby, equipping students to reason and problem solve. How are students engaging in the standards for mathematical practice as they learn this content?

- Establish a physical and social environment in your classroom that builds respectful relationships and enables effective discussion. This will allow students to feel comfortable providing input when participating in class discussions around developing success criteria. For a more in-depth discussion around establishing the learning environment in mathematics, see EBIP #1.

- Plan learning experiences that are strongly aligned to the *KAS for Mathematics*. Assignments should:
    - Align with the expectations defined by grade-appropriate standards.
    - Provide meaningful opportunities for students to engage in the standards for mathematical practices.
    - Give students an authentic opportunity to connect content standards to real-world issues and/or contexts.

- Reflect on the alignment of learning experiences to the expectations of the *KAS for Mathematics* to identify any instructional implications.
    - Is the learning experience already strongly aligned to the standards?
    - If not:
        - Could minor revisions improve the alignment?
        - Could another learning experience fill the gaps that showed up when examining this assignment?
        - Are learning experiences balanced when considered collectively?

What strategies and resources can support the implementation of Evidence-Based Instructional Practice #2: Clarifying and Sharing Clear Learning Goals within the *KAS for Mathematics?*

Brain Research and the Need for Clear Learning Goals:
When students believe they can be successful at a particular task or assignment, they are more likely to persist in their work, especially in the face of a challenge. For more information on the importance of supporting productive struggle and focusing learning by establishing mathematics goals, visit:

- NCTM's *Effective Mathematics Teaching Practices*
    - NCTM's landmark publication *Principles to Actions* connects research with practice. The teaching of mathematics is complex. It requires teachers to have a deep understanding of the mathematical content that they are expected to teach and a clear view of how student learning of that mathematics develops and progresses across grades.

Starting with Teacher Clarity

When teachers focus on the activities students will do without a clear understanding of the intended learning, it is unlikely students will learn what they need to learn (Wiliam & Leahy, 2015). For more information on developing standards-aligned instruction, visit:

- KDE's *Getting to Know the KAS for Mathematics Module* *specifically Section 1D and 1E*
    - Included are a Facilitator's Guide that provides suggestions for structuring each section of Module 1, recommended activities to prompt meaningful investigation of the *KAS for Mathematics* and guidance on talking points to use with the provided slideshows. Additional resources needed to engage with this module are the accompanying PowerPoint and Module at a Glance. The discovery tasks with Section 1D (Connecting with the Content) and Section 1E (Coherence Card Sort) might be particularly powerful for teachers to engage in as the conversations around grade level standards and the degree to which the sample assignments align to those standards can be especially impactful.
- KDE's *Breaking Down a Standard Resource*
    - Designed to mirror the architecture of the *KAS for Mathematics,* the Breaking Down a Standard resource serves to guide educators through taking a deeper look at a specific standard in order to better understand the instructional implications and how those will impact student learning. Annotated samples are available for each grade level (K-8) and each conceptual category for high school.

Establishing Student Clarity and Developing Student Understanding of the Learning Goals and Success Criteria:

Once teachers have gained clarity on what students need to know and be able to do to meet the standards' expectations, they must help students develop that same level of understanding. It is in the assignment that the teacher translates the learning goal into action for the student. For more information on designing learning experiences which "embody" the learning goal visit:

- KDE's *Mathematics Assignment Review Protocol*
    - A protocol intended to help teachers, leaders, and other stakeholders answer the question, "Does this task give students the opportunity to meaningfully engage in worthwhile grade- appropriate content?" Note: This protocol is designed to guide participants through the process of reviewing a single task/assignment. Annotated samples are available for each grade level (K-HS).
- KDE's Grade Level Samples: Breaking Down a Standard and Assignment Review Protocol
    - This digital professional learning experience provides guidance on how to utilize the Breaking Down a Standard resource and how the Assignment Review Protocol might serve as a next step for teachers seeking clarity around a standard. Annotated samples are made available for each of the resources mentioned above per grade level (K-8) and each conceptual category for high school.
- KDE's *Student Assignment Library*
    - The Student Assignment Library provides examples of student tasks that are weakly, partially and strongly aligned to standards. The assignments can be used with the Assignment Review Protocol to develop a better understanding of the

tool and how it can be applied to a teacher's own work when creating and evaluating assignments.

Co-Constructing Success Criteria

Co-constructed success criteria should always be paired with examples of student work, exemplars and models of success for student reference. For more information on ways to support students in monitoring their own progress and determining their next steps in reaching the intended learning goals visit:

- What Works Clearinghouse's *Improving Mathematical Problem Solving in Grades 4 Through 8*
    - The goal of this practice guide is to offer educators specific, evidence-based recommendations that address the challenge of improving mathematical problem solving in grades 4 through 8. Specifically related to clarifying and sharing learning goals, this guide contains recommendations around preparing problems and using them in whole-class instruction, assisting students in monitoring and reflecting on the problem-solving process, teaching students how to use visual representations, exposing students to multiple problem-solving strategies and helping students recognize and articulate mathematical concepts and notation. While the guide mentions grades 4 through 8, the recommendations can apply across grade levels with appropriate modifications.