

Kindergarten Sample - Roadmap to Implementing High Quality Mathematics Instruction



The Roadmap to Implementing High Quality Mathematics Instruction seeks to **ground instruction in the *KAS for Mathematics*, thus reaffirming a commitment to equitable learning opportunities for all Kentucky students.**

How did we get here:

As much of the information in this first section of the Roadmap relates to clarity around the standard and ensuring the learning experience is aligned to grade-level *Kentucky Academic Standards (KAS) for Mathematics*, educators might begin by exploring the connection between these two resources:

- [Kindergarten Breaking Down a Standard sample for KY.K.CC.6:](#)**
 Designed to mirror the architecture of the *KAS for Mathematics*, the Breaking Down a Mathematics Standard resource supports clarity by guiding educators to look deeply at the components of the architecture of the standards, contributing to a holistic understanding of the *KAS for Mathematics*, and the instructional implications resulting from that exploration, including the impact on student learning.
- [Kindergarten Assignment Review Protocol for Savvas enVision 3 Act Math: By the Handful:](#)**
 A protocol intended to help answer the question, “Does this task give students the opportunity to meaningfully engage in worthwhile grade-appropriate content?”

<i>KAS for Mathematics</i>	Cluster:	Learning Experience:
KY.K.CC.6	Compare numbers	Savvas enVision 3 Act Math: By the Handful
Identify the Target of the Standard:		
<p><input checked="" type="checkbox"/> 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.</p> <p><input type="checkbox"/> Procedural Skill/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</p> <p><input type="checkbox"/> 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.</p>		
Identify the Practice Standard:		
May reference Engaging the SMPs: Look fors & Question stems		
<p><input checked="" type="checkbox"/> MP.1. Make sense of problems and persevere in solving them.</p> <ul style="list-style-type: none"> • What information do you have? • What do you need to find out? <p><input type="checkbox"/> MP.2. Reason abstractly and quantitatively.</p> <p><input type="checkbox"/> MP.5. Use appropriate tools strategically.</p> <p><input type="checkbox"/> MP.6. Attend to precision.</p>		

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| <input type="checkbox"/> MP.3 . Construct viable arguments and critique the reasoning of others. | <input type="checkbox"/> MP.7 . Look for and make use of structure. |
| <input checked="" type="checkbox"/> MP.4 . Model with mathematics. <ul style="list-style-type: none"> • How useful was your model at predicting the answer? • Would you change your model after watching the video? • How would you change it? | <input type="checkbox"/> MP.8 . Look for and express regularity in repeated reasoning. |

How did we get here: As educators begin considering what this learning experience might look like and feel like with students, the [Engaging the SMPs: Look fors and Question Stems](#) can be a really great place to start. For this learning experience, questions from MP.1 and MP.4 felt like a natural fit to keep in mind when considering how to move student thinking forward while not taking away the thinking away from the student.



The Roadmap to Implementing High Quality Mathematics Instruction seeks to **support intentional integration of evidence-based instructional practices.**

Identify Evidence-based Instructional Practice(s)
 May reference [Effective Mathematics Teaching Practices \(NCTM\)](#)

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| <input type="checkbox"/> EMTP 1 : Establish mathematics goals to focus learning. | <input type="checkbox"/> EMTP 5 : Pose purposeful questions. |
| <input type="checkbox"/> EMTP 2 : Implement tasks that promote reasoning and problem solving. | <input type="checkbox"/> EMTP 6 : Build procedural fluency from conceptual understanding. |
| <input type="checkbox"/> EMTP 3 : Use and connect mathematical representations. | <input checked="" type="checkbox"/> EMTP 7 : Support productive struggle in learning mathematics. |
| <input type="checkbox"/> EMTP 4 : Facilitate meaningful mathematical discourse. | <input type="checkbox"/> EMTP 8 : Elicit and use evidence of student thinking. |

Teacher Actions:	Student Actions:
<input checked="" type="checkbox"/> Anticipating what students might struggle with during a lesson and being prepared to support them productively through the struggle. <input checked="" type="checkbox"/> Giving students time to struggle with tasks, and asking questions that scaffold students' thinking without stepping in to do the work for them. <ul style="list-style-type: none"> • Play the video of a bowl of green and red grapes. Two kids each grab a handful of grapes. • Start a discussion with students to develop a main question. Ask, What do you wonder? What type of situation is shown in the video? Is this a more/less situation? A how many situation? A who situation? A time situation? Which question do you find most interesting? Which questions could we use mathematics to answer? • Main question: How many grapes did each person grab? Who 	<input checked="" type="checkbox"/> Struggling at times with mathematics tasks but knowing that breakthroughs often emerge from confusion and struggle.

grabbed more grapes?

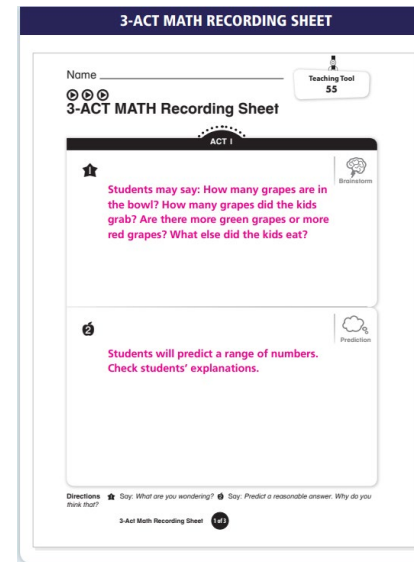
- Have students make predictions. Ask, what is a number too small to be the number of grapes? What number is too many grapes?

✓ Helping students realize that confusion and errors are a natural part of learning, but facilitating discussions on mistakes, misconceptions and struggles.

- Use Jackson's work. Jackson says he knows both kids have 3 green grapes. How can that help him figure out how many grapes each kid has?
- Bria says she knows that the girl has more grapes without counting all the grapes. How does she know?

✓ Praising students for their efforts in making sense of mathematical ideas and perseverance in reasoning through problems.

- Ask what information do you need to answer the main question? I will only give you the information you ask for.
- Show students Act 2, have students discuss whether this information matches their expectations. Boy: 3 green grapes, 2 red grapes. Girl: 3 green grapes, 6 red grapes
- Have students create a model and share.



The image shows a '3-ACT MATH RECORDING SHEET' form. At the top, it says '3-ACT MATH RECORDING SHEET' in a blue header. Below that, there is a 'Name' field and a 'Teaching Tool 55' label. The main title is '3-ACT MATH Recording Sheet'. The form is divided into two sections: 'ACT 1' and 'ACT 2'. The 'ACT 1' section has a star icon and a brain icon, with the text: 'Students may say: How many grapes are in the bowl? How many grapes did the kids grab? Are there more green grapes or more red grapes? What else did the kids eat?'. The 'ACT 2' section has a lightbulb icon and a brain icon, with the text: 'Students will predict a range of numbers. Check students' explanations.'. At the bottom, there are 'Directions' and a small '3-Act Math Recording Sheet' logo.

- Asking questions that are related to the sources of their struggles and will help them make progress in understanding and solving tasks. See 3-ACT MATH recording sheet below.
- ✓ Persevering in solving problems and realizing that it is acceptable to say, "I don't know how to proceed here," but it is not acceptable to give up.
 - Students use their peers as a resource to talk the situation through or to even watch the video again. Students are supported with the 3-ACT MATH recording sheet.
- Helping one another without telling their classmates what the answer is or how to solve the problem.

How did we get here: EMTP 7 feels like a natural fit since this problem-based lesson gives students a situation and they have to persevere to solve. Problem based lessons and [3 Act Tasks](#) provide students the opportunities to reason and take the first initial step to solve the problem in a real-world context.



The Roadmap to Implementing High Quality Mathematics Instruction seeks to **expand educator familiarity with strategies to interweave the development of social emotional competencies with development of mathematics content.**

Identify the Competency Intended to Support the Evidence-Based Instructional Practice:

May reference [Integrating SEAD within the KAS for Mathematics](#) resource library

✓ SELF-AWARENESS	<input type="checkbox"/> SELF-MANAGEMENT	<input type="checkbox"/> SOCIAL AWARENESS	<input type="checkbox"/> RELATIONSHIP SKILLS	<input type="checkbox"/> RESPONSIBLE DECISION-MAKING
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Specific Design Considerations from [Integrating SEAD within the KAS for Mathematics](#) Grade Level Resource

Promote a [growth mindset](#) by presenting culturally relevant tasks. Bring in students' existing funds of knowledge (culture, contexts, language and experiences); students are more apt to engage with mathematics when they can make a connection to the world they live in. Consider ways to get to know students, such as asking them to list their favorite musicians, songs, sports, activities, games, food, etc., or by asking deeper questions about their culture, memories and family. Using resources like [3 Act Tasks](#) provides students the opportunities to reason and take the first initial step to solve the problem in a real-world context.

Teacher Reflection Questions from [Integrating SEAD within the KAS for Mathematics](#) Grade Level Resource

What tasks provide [windows and mirrors](#) into student noticings?

When thinking about this task, I wondered how I could get more insight into my students' lives and cultures. Therefore as an extension, I had my students use objects that they had at home to create a new problem on who had more. This allowed me to see what things are important to my students and what they value.

How did we get here:

Focusing on self-awareness is a natural fit to support EMTP 7, especially as student action, "Preserving in solving problems and realizing that it is acceptable to say, "I don't know how to proceed here, "but it is not acceptable to give up in this particular Roadmap. Another way to support student self-management is to provide opportunities for students to take the initiative for their own learning. Embedding time and space for student reflection can have a significant impact on how well students are able to manage their emotions and express personal agency around the mathematics being learned.